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IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel,)	
W.A. DREW EDMONDSON, in his)	
capacity as ATTORNEY GENERAL)	
OF THE STATE OF OKLAHOMA,)	
et al.)	
)	
Plaintiffs,)	
)	
V.)	No. 05-CV-329-GKF-SAJ
)	
)	
TYSON FOODS, INC., et al.,)	
)	
Defendants.)	

REPORTER'S TRANSCRIPT OF PROCEEDINGS
FEBRUARY 19, 2008
PRELIMINARY INJUNCTION HEARING
VOLUME I

BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

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PROCEEDINGS

February 19, 2008

THE COURT: Be seated, please.

THE CLERK: We're here in the matter of the Attorney General of the State of Oklahoma, et al, vs. Tyson Foods, Inc., et al, Case Number 05-CV-329-GKF. Would the parties please enter their appearance.

MR. BULLOCK: Louis Bullock for the State of Oklahoma.

MS. BURCH: Kelly Burch, State of Oklahoma.

MR. NANCE: Bob Nance for the State of Oklahoma.

MR. BAKER: Fred Baker for the State of Oklahoma.

MR. GARREN: Richard Garren, State of Oklahoma.

MR. PAGE: David Page, State of Oklahoma.

MR. EDMONDSON: Drew Edmondson, State of Oklahoma.

1 application of poultry waste be limited to the needs of the
2 crops. Most importantly for the purpose of this hearing, our
3 evidence will show that these persistent and pervasive
4 violations of state and federal law have infested the rivers
5 and springs and wells of the Illinois River Watershed with
6 biologic pathogens that have created an imminent and
7 substantial threat to human health.

8 Three years ago, Your Honor, the State of Oklahoma
9 filed suit against these defendants alleging environmental
10 damage to the Illinois River watershed due to the excessive
11 surface application of poultry waste. This waste, consisting
12 of fecal matter, bedding and water, contains, among other
13 things, nitrogen and phosphorus and is an effective fertilizer
14 when properly used. We alleged then and still maintain that
15 the litter is being applied well in excess of the agronomic
16 needs of crops and that the resulting runoff from fields has
17 damaged the waters of the basin, including Lake Tenkiller.

18 Trial of the case-in-chief is scheduled next year.
19 However, in the course of preparation for that trial, we began
20 to develop data concerning the effects of this dumping on human
21 health. We feel that data is compelling and because of the
22 human health implications, it could not wait until next year.
23 We, therefore, are seeking this injunction. The legal
24 framework for this hearing is not complicated. It includes the
25 elements for the issuance of a preliminary injunction, the

1 that a correct statement?

2 A. I believe you got the date wrong.

3 Q. What date should it be?

4 A. I think it was 2002 is when it was enacted.

5 Q. I thought I said 2002 or '3?

6 A. I may have misunderstood you.

7 Q. That's all right. Were you ordered in 2002 or '3 to
8 identify all permitted registered water pollution sources in
9 the scenic rivers?

10 A. Yes.

11 Q. Have you done that?

12 A. Yes.

13 Q. Did you write a report on it?

14 A. Yes.

15 Q. Where is that report, where would I find a copy?

16 A. It's on our website.

17 Q. And what does it say?

18 A. It's a long report.

19 Q. Well, just -- do you not know what it says about the
20 Illinois River Watershed?

21 A. Well, one of things it says it's impaired and it said that
22 crucial to resolving impairment is getting the poultry
23 companies to take responsibility for their waste.

24 Q. Do you mention any other sources in your website?

25 A. Yes.

1 Q. Tell me about it.

2 A. Well, it goes through systematically for all the scenic
3 river watersheds and talks about all the various potential
4 sources like septic, like cattle, like municipalities.

5 Q. Were you ordered on the next paragraph to identify an
6 overall pollutant specific load reduction through a TMDL
7 process?

8 A. Yes.

9 Q. Did you do a TMDL process?

10 A. TMDL is still being done in the watershed.

11 Q. When did it start?

12 A. I don't know.

13 Q. Have you seen any results from it?

14 A. I haven't.

15 Q. How do you know it started?

16 A. Well, I'm told that people are working on it.

17 Q. Who?

18 A. The Department of Environmental Quality develops TMDLs.

19 Q. When did they tell you that?

20 A. I couldn't tell you.

21 Q. You were ordered to do this in 2002, were you not?

22 A. Yes.

23 Q. And you're just now starting it and it's not developed to
24 such an extent that we can see anything in writing on it;
25 right?

1 information, we still don't have it. How much have you charged
2 to date, sir?

3 A. I believe the number is about \$400,000 over three and a
4 half years.

5 Q. In your lines of evidence, you talked about doing a review
6 of technical literature?

7 A. Yes, sir.

8 Q. Which led you to the conclusion that there's a high
9 concentration of E. coli, Salmonella and Campylobacter in
10 poultry waste?

11 A. In poultry operations and poultry waste.

12 Q. In poultry operations and in poultry waste. Well, we
13 know, for example, that one of the reasons that we want to
14 thoroughly cook chicken is because of the possibility of
15 Salmonella; right?

16 A. Yes, sir.

17 Q. Chicken can either come to your kitchen with the
18 Salmonella or it can acquire it when it's in your kitchen out
19 on the countertop; is that right?

20 A. I suppose that it can. I don't believe that's the most
21 likely situation.

22 Q. Every warm-blooded mammal is a reservoir of E. coli; is
23 that right?

24 A. I would say that's true, yes, sir.

25 Q. Each one of us here -- all but one of us here in this

1 courtroom would be considered a reservoir for E. coli?

2 A. I certainly am. I can't speak for anyone else.

3 Q. Well, as a toxicologist, you know that to be so, don't
4 you, sir?

5 A. Yes, sir. And that's why we do contribution analyses to
6 sort through these kinds of issues.

7 Q. And cows are a big producer of E. coli, aren't they?

8 A. Can be in certain circumstances.

9 Q. Various kinds. In fact, don't they produce some of the
10 most hazardous kinds of E. coli on occasion?

11 A. Can.

12 Q. And the fact that you find E. coli in the watershed really
13 just tells you that you have E. coli in the watershed; isn't
14 that right?

15 A. If that was the only question that you asked, it would
16 tell you only that but --

17 Q. That's the one I'm asking now.

18 A. But that's not where I stopped.

19 Q. And the fact that you found Campylobacter in the watershed
20 would tell you that something was a source of Campylobacter in
21 the watershed; is that right?

22 A. If you found it there, you would. But the fact that you
23 don't find it there is not an indication that it is not
24 present.

25 Q. Now, I want to visit with you about that a minute. You

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 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 FEBRUARY 20, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME II

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

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15 PROCEEDINGS

16 February 20, 2008

17 MR. JORGENSEN: Good morning, Your Honor.

18 THE COURT: Good morning, Mr. Jorgensen.

19 MR. JORGENSEN: May I start with a housekeeping
20 matter?

21 THE COURT: You may, sir.

22 MR. JORGENSEN: When you get sued, it's the usual
23 thing to come to court on hearing day, but the company Willow
24 Brook asked if I would say to you that they're not here.

25 THE COURT: We got the notice. The notice that they

1 work that we do.

2 Q. Well, let's back up because maybe I misunderstood.

3 MR. BULLOCK: Judge, we're well past the half hour, I
4 just wonder when counsel is going to wrap up. I'm not trying
5 to hold people to specific --

6 MR. GEORGE: Two minutes, Your Honor.

7 THE COURT: Very good.

8 Q. (By Mr. George) I want to make sure I understand, Dr.
9 Teaf. You're not offering an opinion in this case regarding
10 the likelihood of transport of poultry litter to a water body
11 compared to other sources; is that correct?

12 A. No, I'm not. No, I'm not. I'm identifying sources, and
13 I'm identifying receptors.

14 Q. In fact, yesterday when you talked about -- I think you
15 threw out some percentages in terms of cattle manure versus
16 poultry litter. You were talking just about your analysis of
17 how much hits the ground, not how much gets to the water;
18 correct?

19 A. And subsequent to that I discussed the importance of
20 knowing how it may make its way to the water body, yes, sir.

21 Q. But you're not offering an opinion as to whether it got
22 there or not because you're not offering a fate and transport
23 opinion; correct?

24 A. Well, I am offering an opinion about that it got there and
25 I'm offering it for two reasons. One, the bacteria levels are

1 very high and second of all, the signature that was identified
2 is of cattle -- is of poultry.

3 Q. You're relying upon the work of Dr. Roger Olsen for your
4 belief that the water shows the evidence of poultry
5 contamination; correct?

6 A. In part I am and I'm also relying upon that of Dr. Harwood
7 and the other lines of evidence that I described yesterday.

8 Q. But you yourself, sir, have conducted no fate and
9 transport analysis; correct?

10 A. No, I did not, not a formal one, no.

11 Q. Sir, based upon the work that you've done in this case,
12 not the work of others, can you state to a reasonable degree of
13 scientific certainty that if Judge Frizzell grants the
14 injunction that is requested by your client, the water quality
15 standards for bacteria in the Illinois River will be met in
16 2008 and 2009?

17 A. My opinion is that they will be.

18 Q. Can you state that opinion to a reasonable degree of
19 scientific certainty?

20 A. I can based on the information that I have reviewed.

21 Q. You're willing to stake your professional reputation on
22 the proposition that if this Court enters the injunction sought
23 by your client, the water quality standards for bacteria in the
24 Illinois River will be met next year?

25 A. Based on all the information that I have and my knowledge

1 A. Yes, there is. And the reason that I just didn't recall
2 at the time -- the Wise County cases involved bacterial growth
3 producing hydrogen sulfide in residential wells as a
4 consequence of the introduction of natural gas and condensate.
5 So I didn't think about them as coming from the surface, but
6 the contaminant of concern was hydrogen sulfide is microbially
7 produced.

8 Q. Sir, you were not asked to evaluate in that case the fate
9 and transport of bacteria found in groundwater, were you?

10 A. No.

11 Q. You were simply evaluating the effects of groundwater --
12 I'm sorry, of bacteria found in certain wells?

13 A. That's correct.

14 Q. So as it stands today, sir, you have never before worked
15 on a litigated matter in which you were asked to offer an
16 opinion as to the fate and transport of bacteria to
17 groundwater?

18 A. That's correct.

19 Q. Sir, prior to being retained by the Plaintiffs' lawyers
20 representing the attorney general's office in this case, had
21 you ever worked on a research project or published a paper
22 related to the movement of bacteria in either surface water or
23 groundwater?

24 A. No.

25 Q. Sir, have you ever had your opinions in an environmental

1 Q. Well, what is your criteria?

2 A. My criteria is that when the soil test phosphorus is above
3 65, there's no agronomic benefit -- phosphorus agronomic
4 benefit from applying that litter.

5 Q. So if it's below 65, you can't provide this Court any
6 criteria as to what would be disposal or what wouldn't be?

7 A. That's right. You could have a fertilizer benefit if it's
8 below 65.

9 Q. Well, now, you've said several times in your direct
10 examination that if the soil test phosphorus was 65 STP, that
11 using poultry litter would not provide any agronomic benefit
12 for phosphorus.

13 A. That's correct.

14 Q. Right?

15 A. That's correct.

16 Q. All right. Your criteria that your opinion is based upon
17 is only related to the agronomic need for one macronutrient and
18 that is phosphorus?

19 A. That's correct.

20 Q. No other element or constituent in poultry litter is an
21 element of your opinion; correct, your criteria?

22 A. That's generally correct, yes.

23 Q. So even -- now, tell me this, Dr. Johnson, if the soil in
24 a pasture in the Illinois River Watershed is at 65 STP, would
25 you agree that poultry litter could still improve the yield of

1 the pasture grasses on that pasture if there's an additional
2 need for nitrogen?

3 A. If an additional need for nitrogen has been identified
4 through a soil test and through practice, then there could be
5 an additional benefit from the nitrogen.

6 Q. You could improve the yield?

7 A. You could improve the yield.

8 Q. And yield for common usage, that means you can get more
9 grass per acre, is that a fair way --

10 A. That's correct, you could.

11 Q. So if you are grazing that pasture, you could graze more
12 cattle on an acre if your yield is better, would you agree?

13 A. Yes, you could. If you had identified that there was a
14 nitrogen deficiency in the soil, that would not meet the yield
15 potential for that pasture forage.

16 Q. And if you were cutting hay on that field, you could get
17 more bales or more tons of hay per acre because of that boosted
18 yield, do you agree?

19 A. If you had identified a nitrogen deficiency.

20 Q. Well, that was the premise of my question.

21 A. Yes, I just want to make sure that we're clear that that
22 always is there.

23 Q. Well, and that same series of questions, Dr. Johnson, if
24 the field is at 65 STP but there's a recognized by soil test
25 deficiency for potassium, you could improve the yield of the

1 grasses on that pasture with poultry litter, even if it's 65
2 STP, do you agree?

3 A. Yes.

4 Q. Now, the nitrogen, phosphorus and potassium in litter,
5 those are what we call macronutrients.

6 A. Yes.

7 Q. Do you agree with that?

8 A. Yes.

9 Q. What is a micronutrient?

10 A. A micronutrient is another essential nutrient or group of
11 essential nutrients that plants cannot complete their life
12 cycle without but for which the requirement is much lower in
13 total amount.

14 Q. All right. You said a plant needs these in order to, you
15 said complete its life cycle?

16 A. Yes.

17 Q. All right. Tell me what micronutrients typically can be
18 found in poultry litter.

19 A. All the micronutrients can typically be found in poultry
20 litter and that would include iron, manganese, copper, zinc,
21 boron, chlorine and molybdenum

22 Q. Now, you said -- I believe you answered a question that
23 poultry litter cannot be customized, custom blended to fit a
24 particular crop, so to speak?

25 A. Yes.

1 Q. So you have to agree it's a whole commodity in and of
2 itself, take it or leave it. You either got to use it all or
3 you use none of it. You can't put down potassium and not put
4 down nitrogen. You can't put down zinc, but not put down
5 phosphorus?

6 A. That's true.

7 Q. Right?

8 A. That's true.

9 Q. You just use it.

10 A. You get it all.

11 Q. You get it all, that's right.

12 A. Whether you need it or not.

13 Q. So if the soil in a pasture had sufficient zinc, one of
14 the micronutrients you mentioned, had sufficient zinc, but it
15 needed phosphorus or it needed nitrogen, would you still accuse
16 that farmer of disposing of poultry litter if he uses it on
17 that field?

18 A. If he uses it on the field to correct a phosphorus
19 deficiency?

20 Q. Right.

21 A. There would not be a problem with that practice if it were
22 practiced as it is with commercial fertilizer.

23 Q. I didn't ask you about commercial fertilizer.

24 A. I understand that.

25 Q. You understood my question was --

1 A. Yes.

2 Q. -- that we're assuming that that soil is completely
3 sufficient to meet the need of the micronutrient zinc?

4 A. Yes.

5 Q. But the soil test shows it needs nitrogen and it needs
6 phosphorus. Putting poultry litter on that field, that's not
7 waste disposal, is it?

8 A. No.

9 Q. All right.

10 A. It may not be.

11 Q. In fact, Dr. Johnson, you cannot tell this Court that
12 forages receive no benefits whatsoever when poultry litter is
13 utilized in the soils at 65 STP; right?

14 A. I can tell the Court that there's no phosphorus benefit to
15 the forage --

16 Q. All right. That wasn't my question.

17 A. -- when poultry litter is applied. And that for the most
18 part, the other nutrients are either adequate or have not been
19 tested to determine their deficiency.

20 Q. Dr. Johnson --

21 A. And so then I would say no.

22 Q. All right. I need you to listen to my question and answer
23 my question.

24 A. Okay. I will.

25 Q. You cannot tell this Court that forages do not receive any

1 benefit from the use of poultry litter if the soil is at 65
2 STP; is that correct?

3 A. You'd have to identify what you mean by benefit to me.

4 Q. Improved yield.

5 A. I don't know whether that would happen or not.

6 Q. The question is you cannot categorically tell this Court
7 that if you put poultry litter on a pasture that is already at
8 65 STP that there will be no benefit. You cannot make that
9 categorical statement, can you?

10 A. That's true.

11 Q. And you're not aware of any published study that would
12 state that the litter application rates that are typically used
13 in the Illinois River Watershed would actually harm the yield
14 of pasture grasses?

15 A. That's true.

16 Q. Now, you do understand that the preliminary injunction
17 motion that's been filed by the plaintiffs in this case, it's
18 based on this notion or this allegation that poultry litter is
19 somehow causing contamination of the waters of the state from
20 pathogenic bacteria. Do you understand that about this motion?

21 A. Yes.

22 Q. All right. You have to agree that the opinions you're
23 offering, Dr. Johnson, have really nothing to do with that
24 question; right?

25 A. That's correct.

1 of rocks and the soil covered by rocks.

2 Q. All right. On this Table 9, sir, has the soil test
3 phosphorus as one of the columns?

4 A. Yes.

5 Q. And you would agree, sir, that the legal maximum here in
6 the Code 590 is 300 STP, not the 65 you propose?

7 A. Yes.

8 MR. NANCE: I object as calling for a legal
9 conclusion, Judge.

10 THE COURT: I think he's just asking a factual bit of
11 information there. Overruled.

12 A. What you stated is what is found on this table.

13 Q. (By Mr. McDaniel) Thank you. Now, let's go back to the
14 very beginning, sir. Page 1 of the document --

15 A. Yes.

16 Q. -- PI Exhibit 4. Now, just to circle back, you made the
17 statement that putting poultry litter down anywhere at 65 STP
18 above amounts to waste disposal?

19 A. Yes.

20 Q. But let's look here under the purposes on page 1 of the
21 code. It says the purposes of the nutrient management code are
22 to budget and supply nutrients for plant production; right?

23 A. Yes.

24 Q. To properly utilize manure or organic byproducts as a
25 plant nutrient source; right?

1 conclusions.

2 A. Okay.

3 Q. The last sentence. These scientists, Dr. Sharpley
4 concluded -- it starts with applications. "Application of
5 litter based on the P index allows more management options --"

6 A. Just a minute now, where are you at?

7 Q. You can see it on the screen, she's blown it up for you.

8 A. I was trying to find it here.

9 Q. Do you see where it is on the screen, Dr. Johnson?

10 A. Yeah, I see it.

11 Q. Dr. Sharpley and others say, "Application of litter based
12 on the phosphorus index allows more management options than
13 applications based on a soil test P threshold. These studies
14 have provided evidence that the phosphorus index provides a
15 better assessment of phosphorus runoff than Mehlich III soil
16 test P, especially when litter P is added. That's what it
17 says, doesn't it?

18 A. Yes, and I agree wholeheartedly.

19 Q. All right, thank you. Now, in fact, Dr. Johnson, you
20 don't even believe poultry litter is a fertilizer. Isn't that
21 what I heard you say?

22 A. I said it's not a very good fertilizer, yes.

23 Q. Not a very good fertilizer?

24 A. No.

25 Q. But it is a fertilizer?

1 A. Well, it's a source of nutrients.

2 Q. Yes or no, it is a fertilizer?

3 A. And you could call it a fertilizer. It is not registered
4 as a fertilizer.

5 Q. And part of your affidavit, part of what Mr. Nance asked
6 you, you have the opinion that it doesn't qualify as a soil
7 amendment?

8 A. That's true.

9 Q. Let's look at Exhibit 18. This is OSU Production
10 Technology Publication PT 98.7. Do you see that?

11 A. I'm looking for it.

12 Q. It's on the screen, but I'll be glad to help you find it.
13 Who wrote this?

14 A. Yes.

15 Q. Who wrote this?

16 A. Dr. Hailin Zhang.

17 Q. Who is he?

18 A. He's the current extension soil nutrient management state
19 specialist for soil nutrients.

20 Q. He is the nutrient management specialist for the State of
21 Oklahoma?

22 A. That he is.

23 Q. Would you read aloud the first paragraph?

24 A. "Most people recognize the value of animal waste as a
25 plant nutrient source or soil amendment but the potential of

1 IN THE UNITED STATES DISTRICT COURT
 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,)
 4 W.A. DREW EDMONDSON, in his)
 capacity as ATTORNEY GENERAL)
 5 OF THE STATE OF OKLAHOMA,)
 et al.)
 6)
 Plaintiffs,)
 7)
 V.) No. 05-CV-329-GKF-SAJ
 8)
)
 9 TYSON FOODS, INC., et al.,)
)
 10 Defendants.)

11
 12
 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 FEBRUARY 21, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME III

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

19
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LOWELL MARK CANEDAY

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15 PROCEEDINGS

16 February 21, 2008

17 THE COURT: Mr. Bullock, Mr. George, and Ms.
 18 Southerland and I spoke a second ago outside the courtroom with
 19 regard to evidentiary matters. We've been going at such a
 20 rapid pace and because there has been an agreement with regard
 21 to exhibits on direct, there have been promises made to the
 22 Court with respect to exhibits that have been used on cross
 23 that they would be handled at the next break or at lunch that
 24 has not been done. So the concern is that going forward, we
 25 need to handle this matter very quickly or it presents real

1 documents from the State of Oklahoma and from the USGS about
2 water quality in the IRW. I reviewed affidavits of experts in
3 the case including Dr. Teaf, Caneday, Olsen, Engel, Fisher,
4 Lawrence to name some of the ones I can remember off the top of
5 my head, numerous peer reviewed articles in the literature.

6 Q. Have you also reviewed any environmental or health
7 assessment data with regard to bacteria in preparation for your
8 opinions?

9 A. Yes, so reviewed standards for the State of Oklahoma and
10 for the U.S. EPA and again numerous peer reviewed articles on
11 the subject.

12 Q. In particular for your evaluation in this case, what water
13 quality standards have you evaluated?

14 A. I have evaluated the State of Oklahoma's recreational
15 water quality standards and U.S. EPA's recreational water
16 quality standards.

17 Q. Do you know how those standards are set?

18 A. Yes, those standards are set based on epidemiological
19 studies. And so in those studies, one measures the rate of
20 disease and usually, most generally gastroenteritis is the most
21 commonly measured credible disease syndrome. One measures the
22 rate of disease in exposed individuals -- so people who are in
23 the water would be exposed individuals, compares that to
24 individuals -- the rate of disease in individuals who are not
25 exposed. And also at the same time measures other parameters

1 such as indicator bacteria concentrations to determine what the
2 correlations might be between illness rates of those who are
3 exposed to the water and potential correlated factors, again,
4 like fecal indicator bacteria concentrations.

5 Q. So those standards are based on indicator bacteria?

6 A. Those standards are based on indicator bacteria
7 concentrations, yes.

8 Q. Now, are fecal indicator bacteria an important aspect of
9 evaluating water quality?

10 A. Yes, fecal indicator bacteria are relied on throughout the
11 world as indicators of water quality.

12 Q. Okay. Is there any other reason why fecal bacteria would
13 be important as a measure or test of water quality evaluations?

14 A. Well, they are really important because they do have a
15 correlation with the risk of human health when recreating in
16 water bodies.

17 Q. Is it possible to test for all potential pathogens in
18 water?

19 A. It is really impossible to test for all potential
20 pathogens. There are so many possible organisms that can cause
21 waterborne disease that the expense, the time, the logistics of
22 doing such analyses have always proven to be beyond what we can
23 do in science.

24 Q. Then do the fecal indicator bacteria, do they act as a
25 sort of surrogate for all these other pathogens?

1 A. Yes, we use the fecal indicator bacteria as a tracer or a
2 surrogate to indicate the risk of the presence of human
3 pathogens and thus the increased risk to human health from
4 exposure to that water.

5 Q. Now, is it true that some pathogens that are in fecal
6 material can be alive but not be culturable?

7 A. That's correct. The -- I guess the century old
8 methodology for measuring bacterial concentrations is to
9 culture them on some sort of an auger medium. We've known in
10 the last 20 years or so that many organisms, when they're
11 excreted from their host and they get out into the environment,
12 may not die off, but they may become -- they may die off, but
13 they may also become stressed, physiologically stressed, in
14 which case they can no longer grow on the media that we
15 normally use to culture them or detect them.

16 And so many studies have shown that when these
17 bacteria become viable, we call this the viable but
18 non-culturable phenomenon. They still have indications of
19 metabolism and of the ability to sustain themselves. They can
20 also be resuscitated or revived and start growing again when
21 they get into a host, so when they get back into an environment
22 that is conducive to their growth. So in spite of the fact
23 that we cannot culture them and detect them, they still are
24 potentially dangerous. And this is known in microbiology as
25 the viable but non-culturable phenomenon. It's been seen in

1 pathogens such as Salmonella and Campylobacter.

2 THE COURT: I take it viability depends on a number of
3 factors, temperature, other environmental factors. Give me an
4 idea of what those major factors are and the time frame within
5 which viability exists.

6 THE WITNESS: Okay. In microbiology, there's almost
7 never a real simple answer, so I'm sorry about that. But it
8 depends on what type of --

9 THE COURT: I'm afraid that's usually the case in the
10 law, too.

11 THE WITNESS: Well, good, then you'll understand.
12 Depending on what type of bacteria one is talking about, they
13 can be -- we might say inactivated. So inactivated or killed
14 by factors such as ultraviolet radiation is a potent one. Many
15 bacteria are very susceptible to high salt levels or other high
16 osmotic pressure levels. There is generally in the environment
17 cooler temperatures are more conducive to long-term dormant
18 survival. However, in warmer waters, there's also evidence
19 that bacteria given that -- gut bacteria, enteric bacteria,
20 given some sort of a carbon source to grow on, that they can
21 actually survive and grow in sediments of -- or at least retain
22 viability long term in the sediments of water bodies.

23 And the nutrient availability is one of the primary
24 factors that will inactivate microorganisms when they are
25 released into the environment. Desiccation also plays a role,

1 so drying out. And again, it's very hard to say, it depends on
2 a lot of common conditions that the bacteria encounter. If
3 they are exposed fully to ultraviolet radiation and desiccated,
4 it may take only a matter of hours for them to be permanently
5 inactivated or killed. On the other hand, if they're shielded
6 from radiation, if they're provided with some moisture, then
7 they may persist for up to months at a time.

8 THE COURT: Thank you. Mr. Page.

9 MR. PAGE: Thank you, Your Honor.

10 Q. (By Mr. Page) So those bacteria can remain viable for
11 months at a time if they have certain environmental conditions
12 available?

13 A. That's correct.

14 Q. At the same time, if you use a standard method to try to
15 identify that bacteria in the environment, it wouldn't
16 necessarily be culturable?

17 A. That's correct, because the bacteria may be surviving and
18 persisting in the environment, but they may be stressed to the
19 point where they won't grow on this basically artificial growth
20 substrate that we're providing them.

21 Q. Now, if a pathogen such as Campylobacter goes into this
22 viable but not culturable state, can it then also remain as a
23 hazard to human health?

24 A. Yes, studies have shown that viable but non-culturable
25 organisms, when passed into a host such as perhaps if they were

1 Q. And elsewhere?

2 A. Yes. And Salmonella was identified in edge of field
3 samples and enumerated.

4 Q. Really?

5 A. Yes.

6 Q. You don't agree that the State took 68 samples for soil
7 and found none with Salmonella in them?

8 A. No, I wasn't talking about soil. I was talking about edge
9 of field. But soil, that could well be. I don't disagree.

10 Q. So what the State did find was fecal indicator bacteria,
11 that's right?

12 A. The State did find fecal indicator bacteria, yes.

13 Q. Let's bring up Defendants' Demonstrative 33, if we can. I
14 think this might help lay out what we've been talking about. I
15 think it's 32. I'm sorry to have used the wrong number, it's
16 32. Okay. So you talked about fate and transport, you did not
17 do a fate and transport analysis in this case?

18 A. Correct.

19 Q. Okay. So let's talk about what fate and transport is.
20 What do you see on your screen there?

21 A. Well, can I restate that for a second or can I please
22 restate my answer?

23 Q. Sure.

24 A. We didn't do a specific fate and transport analysis, but
25 we did construct our sampling regime so as to be able to assess

1 Q. It's very prevalent.

2 A. It's -- it is common in many areas and -- but it's
3 certainly more associated with fecally contaminated areas.

4 Q. Okay. And it comes from many sources?

5 A. That's right.

6 Q. As a matter of fact, almost every animal who sheds feces
7 sheds fecal indicator bacteria?

8 A. Correct.

9 Q. So in the field I believe you testified that -- well, let
10 me back up. So generally speaking, a fate and transport
11 analysis, it refers to the elements and attributes that affect
12 a bacterium's survival rate in the environment and the speed
13 and manner with which it moves; is that right?

14 A. Those are some of the parameters that one investigates.

15 Q. Okay. So in a traditional fate and transport analysis,
16 you're trying to see if something gets from point a to point B
17 and how it might get there?

18 A. Yes, simplistically put.

19 Q. And it's much more important to do fate and transport or
20 to understand that kind of a process where you have multiple
21 sources of the item that you are looking for?

22 A. Can you ask me that question a different way? I'm not
23 sure I follow.

24 Q. Sure. Isn't fate and transport that much more complex
25 when the items that you're studying, the bacteria that you are

1 studying come from multiple sources?

2 A. Well, it really would depend on your study design. I
3 can't say that. It depends on the question that you're asking.

4 Q. Is it easier for you to track one bacteria through the
5 environment or multiple bacteria?

6 A. Multiple species, you mean?

7 Q. Yeah.

8 A. It would be easier to track one species than multiple
9 species.

10 Q. And if the one type of bacteria comes from just one
11 source, would it be easier to track it through the environment?

12 A. Compared to?

13 Q. Multiple sources.

14 A. Compared to a bacteria that comes from multiple sources?

15 Q. Exactly right.

16 A. Well, again, it would depend on the experiment design. It
17 would depend on where you were starting and where you were
18 ending up.

19 Q. All right. Well, let's move into those factors.
20 Different bacteria move through the environment at different
21 rates, don't they?

22 A. I'm not aware of any definitive research on that subject.
23 It's pretty -- it's pretty well understood that many factors
24 affect bacterial fate and transport, but it's not well
25 understood how fast they move with respect to one another.

1 It's well understood, for example, that viruses move faster and
2 farther than bacteria and that protozoa don't because viruses
3 are small, bacteria are middle and protozoa are big.

4 Q. Different types of bacteria move through the environment
5 at different rates; isn't that correct?

6 A. No, I don't -- I would not carte blanche agree with that
7 statement.

8 Q. Do you remember giving a deposition in this case?

9 A. Yes.

10 Q. Do you remember that you were under oath when you gave
11 that deposition?

12 A. Yes.

13 Q. Let's bring up, if we can, page 75, line 19 to page 76,
14 line 2 in your deposition.

15 (An excerpt of the videotaped deposition of Valerie
16 Harwood was played.)

17 Q. "Do you have an expert opinion on whether the types of
18 bacteria in this case move at different rates?"

19 A. Did you ask me a question?

20 Q. (By Mr. Jorgensen) You're waiting to answer.

21 (An excerpt of the videotaped deposition of Valerie
22 Harwood was played.)

23 A. "Bacteria move at different rates given the physical -- a
24 lot of it has to do with the physical influences upon them and
25 also has to do with their size. But so there are a lot of

1 factors that would influence whether they would -- at what rate
2 they would move."

3 Q. (By Mr. Jorgensen) So to restate, bacteria move at
4 different rates?

5 A. Depending on in part -- or in large part, I believe, on
6 the physical and chemical factors that are influencing their
7 movement.

8 Q. And those factors can include temperature?

9 A. For bacterial movement?

10 Q. Yes.

11 A. It could be a factor.

12 Q. Location within the water column?

13 A. Yeah.

14 Q. Presence of vegetation?

15 A. Yes.

16 Q. The media that they're moving through, whether it's grass
17 or soil?

18 A. Yes.

19 Q. The size of the bacteria, some bacteria are big, some are
20 small?

21 A. Again, the size differences don't make nearly as much of a
22 difference as the physical and chemical factors.

23 Q. And the size of the spaces that they're moving through?

24 A. Correct.

25 Q. All of those are factors that affect how bacteria move?

1 A. Correct.

2 Q. So if you were to find a bacteria in the poultry house,
3 you could not assume -- rather if you found two types of
4 bacteria in the poultry house, you could not simply assume that
5 they would move together?

6 A. If I found two types of bacteria in the poultry house and
7 then what would happen to them?

8 Q. Could you assume that they would move through the
9 environment together at the same rate?

10 A. Well, they're in the poultry house now, where are they
11 going to go after that?

12 Q. If you found two different types, two different species of
13 bacteria in a field, could you assume that they would move at
14 the same rates?

15 A. I wouldn't want to assume it, I would want to test it.

16 Q. Okay. I think that's right. Bacteria also die at
17 different rates; isn't that right?

18 A. Correct.

19 Q. A lot of factors affect how long they can survive out in
20 the environment; right?

21 A. Correct.

22 Q. A bacterium's ability to survive depends on its own unique
23 genetics?

24 A. Yes, and to the -- of course, the physical, chemical
25 insults that it's subjected to.

1 Q. I think that's very important, so let's address those.
2 So, for instance, in a field, a bacterium could be affected in
3 its die-off rates by sunshine, oxygen, temperature changes,
4 humidity changes, pH changes, salinity changes, predation
5 changes and time?

6 A. Correct.

7 Q. All those things would kill bacteria at different rates?

8 A. Kill or inactivate or make non-viable.

9 Q. And a moment ago I believe you said that sunlight
10 typically kills bacteria if it can reach the bacteria within
11 two hours. Do you remember saying that?

12 A. Well, no, I didn't say if it would reach the bacteria
13 within two hours. I said it would kill it within a couple of
14 hours, that's a broad estimate, if the bacteria were directly
15 exposed.

16 Q. Were directly exposed. So if I can use an example, in a
17 cow pie -- this is kind of an embarrassing case and I'm just
18 going to launch ahead.

19 A. Not to me.

20 Q. A cow pie is a little pie with a crust. Isn't it true
21 that the bacteria inside that cow pie are protected from the
22 sunlight or at least partially protected?

23 A. Yeah, yes.

24 Q. So they would die off at a much slower rate --

25 A. Than what?

1 Q. -- than if they were spread out on a field?

2 A. Correct.

3 Q. And if you were to spread out bacteria on the field in a
4 thin, fine dust and thereby expose them to sunlight, those
5 would die within a few hours?

6 A. Well, that depends on what you mean by a thin, fine dust.

7 Q. Thin enough that they could see the sunlight, they could
8 be exposed to the sunlight?

9 A. If they are directly exposed, then they -- we're going to
10 have a pretty high inactivation rate as long as they don't make
11 it into the soil. If they do make it into the soil, then
12 they'll be protected.

13 Q. And in talking about those same factors, dryness kills
14 bacteria. I believe you used the word desiccation by that, but
15 you mean dryness; right?

16 A. Correct.

17 Q. And that kills bacteria?

18 A. Correct.

19 Q. So the same thing, a cow pie shelters bacteria by keeping
20 in the moisture; is that right?

21 A. Compared to?

22 Q. Compared to a thin dust?

23 A. Yeah, compared to a thin dust.

24 Q. Now, you're not offering an opinion in this case as to the
25 relative rates of movement of bacteria that you've studied and

1 testified about; is that right?

2 A. Not to the relative rates of movement, no.

3 Q. In fact, as part of your work in this case, you did not
4 study the movement characteristics of any type of bacteria in
5 the watershed, did you?

6 A. No, I did not.

7 Q. Nor are you offering any opinion today about the different
8 survival rates of the different bacteria in the Illinois River
9 Watershed?

10 A. Can you rephrase that, sorry.

11 Q. Are you offering any opinion today as to the relative
12 survival rates of the bacteria that you found in the watershed?

13 A. No.

14 Q. And you didn't study under what conditions and how long
15 bacteria survived in this watershed, did you?

16 A. No, but we have done extensive studies of that in my lab.

17 Q. But you didn't study it here in the watershed?

18 A. Not in the watershed, no.

19 Q. Now, let's focus on the barn there on the screen. I've
20 got that up as a representative of a poultry house. You don't
21 know very much about the survivability of bacteria in poultry
22 litter lying on a poultry house floor, do you?

23 A. I know that they're in a relatively stressful situation in
24 that environment but I think you said relative survivability?

25 Q. Right.

1 A. Meaning with respect to one another?

2 Q. To each other, to one another.

3 A. We know that Enterococci tend to survive better than
4 E. coli in poultry litter. That's one thing that's fairly
5 well-established in the literature.

6 Q. And you know that poultry litter in houses is often
7 layered, multiple layers go in?

8 A. Yes.

9 Q. And it sits there for a while?

10 A. Yes.

11 Q. Do you have an opinion whether the time that passes and
12 the layering kills off the bacteria?

13 A. I would -- my opinion would be that -- which I haven't
14 tested as we've established, but my opinion would be that the
15 bacteria on the top layer of litter -- there are probably more
16 viable and culturable bacteria on the top layer of the litter
17 than there are at lower layers.

18 Q. And the ones at the lower layers would be dead or dying?

19 A. Well, they would be stressed at least.

20 Q. So you didn't study how long bacteria can survive laying
21 out in a field after they were removed from a poultry house,
22 did you?

23 A. Not specifically.

24 Q. You didn't study the specific fate and transport
25 characteristics of bacteria moving between fields in the

1 watershed, did you?

2 A. No, I did not.

3 Q. And you didn't study the bacterial survival

4 characteristics in the streams in the IRW?

5 A. Not specifically in the streams. Although again, we've
6 done a lot of work in my labs, so I have a strong basis for
7 opinions about that.

8 Q. You're not offering an opinion in this case as to the
9 relative bacterial survival characteristics in the streams, are
10 you?

11 A. You'd have to be a little bit more specific in your
12 question.

13 Q. Did you study bacterial survival characteristics in the
14 streams in the Illinois River Watershed?

15 A. Not in terms of an experimental study, no.

16 Q. All right. Let's walk through this demonstrative. So in
17 a traditional fate and transport, you start in the poultry
18 house, you move to the field where the litter is applied. And
19 then you have to track how the litter moves, if at all, how
20 bacteria in the litter move, if at all, as they encounter an
21 edge of a field; is that right?

22 A. Well, there's all sorts of ways that you can design a
23 study like that.

24 Q. Is that one way --

25 A. It depends on your questions.

1 Q. Is that one way to design it?

2 A. That is one way to design it.

3 Q. Then at the edge of a field you might encounter another
4 field; is that right?

5 A. The edge of a field would be the edge, there would be
6 something there to stop it.

7 Q. There would be something there to stop the bacteria from
8 moving off the edge of the field?

9 A. No, there would be -- an edge of a field means an edge.
10 There's something else there, a road, a ditch, something.

11 Q. Or another field?

12 A. I'd call that the same field.

13 Q. Okay. So it's your testimony that in the Illinois River
14 Watershed all fields end in either a road or a ditch?

15 A. My concept of the term -- I'm sorry. Can I explain just
16 briefly? My concept of what an edge of field is, is it's the
17 end of a large, grassy expanse that would make up a field and
18 then there would be something that would interrupt that grassy
19 expanse, whether it be a ditch or a ditch and a road or a
20 structure or something.

21 Q. And did you observe the sampling in this case?

22 A. No, I did not.

23 Q. So do you know if at the edge of the field, there was
24 simply another field or always a ditch or a road?

25 A. In the edge of field samples that were collected in this

1 case, there was some sort of a ditch or a depression in which
2 water could collect because those were water samples, the edge
3 of field samples.

4 Q. So there were never -- if other witnesses have testified
5 that there were puddles at the edge of a field, you contradict
6 them?

7 A. No, I said a depression or a ditch or something where they
8 could collect the water.

9 Q. In fact, you don't know what was at the edge of the field;
10 isn't that right?

11 A. From what I've been informed, it's usually a ditch.

12 Q. In cases where it's a ditch or not a ditch, if there's
13 another field beyond it, let's move through that, and then
14 let's move through the demonstrative, and eventually then you
15 reach the stream. If the question you are trying to address in
16 a traditional fate and transport, and this is what I'm trying
17 to bring out, that the bacteria in the stream came from the
18 poultry house, don't you have to track it across the
19 environment?

20 A. To demonstrate what?

21 Q. If you are trying to show --

22 MR. JORGENSEN: Your Honor, may I approach the
23 demonstrative? It might help. We're having some trouble,
24 maybe I can cut it short.

25 THE COURT: Yes.

1 Q. (By Mr. Jorgensen) Was the question that you were trying
2 to address in this case, Dr. Harwood, whether bacteria that are
3 found in the streams, whether those came from poultry litter?
4 Is that the question you were trying to address?

5 A. Not directly whether bacteria that came from one
6 particular field were in one particular stream, but whether
7 there was a gradient of these signals from one compartment, in
8 other words, from one type of sampling entity to another.

9 Q. So the bacteria that you find in a stream, E. coli, let's
10 take that for example, they could come from cattle; right?

11 A. In certain streams there would be some possibility for
12 contamination from cattle.

13 Q. They could come from birds?

14 A. There could be a bird component.

15 Q. If you found Salmonella, it could come from reptiles?

16 A. Salmonella has been isolated from reptiles.

17 Q. So if you found Salmonella in the streams of the Illinois
18 River Watershed, it could come from reptiles? I'm not trying
19 to trick you with these questions. I'm actually trying to
20 clarify what you did.

21 A. So if I found Salmonella at an edge of the field sample I
22 would --

23 Q. If you found Salmonella in the streams of the Illinois
24 River Watershed, they could come from reptiles?

25 A. They could come from other sources other than -- than that

1 field, yes.

2 Q. And it was your job to help the plaintiffs understand
3 whether the bacteria that you found in water, groundwater or
4 streams, whether it came from poultry litter?

5 A. It was my job to determine whether or not there's a
6 correlation between the practices of land applying this poultry
7 litter and the contamination that's appearing in streams,
8 that's how I would phrase it.

9 Q. And you did not do that through a traditional fate and
10 transport analysis, you did it through the microbial source
11 tracking we were just talking about?

12 A. We did the microbial source tracking, yes, as a way of
13 determining whether or not we had a specific poultry litter
14 signature in that water.

15 Q. All right. Now, let's talk for just a moment about the
16 animals that live in the Illinois River Watershed. Pigs carry
17 Campylobacter; is that true?

18 A. Pigs are not well-known to carry Campylobacter. I'm sure
19 there's been a couple of studies that have found them.

20 Q. And Salmonella also, don't pigs also carry Salmonella?

21 A. Yes, pigs carry Salmonella.

22 Q. Most reptiles, I think we established, carry Salmonella?

23 A. I wouldn't say most reptiles, but I know they've been
24 isolated from some.

25 Q. Humans contribute fecal matter to the Illinois River

1 Watershed directly?

2 A. Hopefully not.

3 Q. You don't know whether they contribute it directly?

4 A. No, I don't know.

5 Q. Let's look at page 186, line 14 of your deposition. Page
6 186, lines 14 to 21.

7 (An excerpt of the videotaped deposition of Valerie
8 Harwood was played.)

9 Q. "So humans can contribute fecal bacteria to waterways
10 directly?

11 A. "Directly, yeah, and also through their waste disposal
12 systems.

13 Q. "Okay. And are septic systems a potential source of fecal
14 pathogen contamination?

15 A. "Septic systems can be if they're not properly constructed
16 to be separated from the water table."

17 Q. (By Mr. Jorgensen) Dr. Harwood, you haven't studied how
18 many species of animals live in the watershed, have you?

19 A. No.

20 Q. You don't know how many types of birds live in the
21 watershed?

22 A. No.

23 Q. You haven't studied the migration patterns of birds
24 through the watershed?

25 A. Not directly, no. I've had some information on it, but I

1 have not myself studied that.

2 Q. You did not quantify the volume of manure deposited by
3 each different type of animal in the watershed, did you?

4 A. Not myself, no. Although I have seen information on the
5 subject again and I know that annually in the Illinois River
6 Watershed there's about 350,000 tons of poultry litter land
7 applied. I know that from Chris Teaf's work, that the volume
8 of, for example, poultry litter is one of the dominant sources
9 of fecal material contributed.

10 Q. Let's look at page 72, 19 of your deposition, 72, 19 to
11 21.

12 (An excerpt of the videotaped deposition of Valerie
13 Harwood was played.)

14 Q. "Did you attempt to quantify the type of manure from each
15 type of animal in the watershed?

16 A. No, I did not."

17 MR. JORGENSEN: And Then let's go to page 121, line 25
18 to 122, 2 of your deposition.

19 (An excerpt of the videotaped deposition of Valerie
20 Harwood was played.)

21 Q. "Do you know the per capita fecal production of any living
22 animal in the IRW?

23 A. "No."

24 MR. JORGENSEN: And then let's go to page 72, line 25
25 to page 73, 3.

1 (An excerpt of the videotaped deposition of Valerie
2 Harwood was played.)

3 Q. "Did you attempt to quantify the volume of bacteria that
4 come from each type of animal in the watershed?

5 A. "No, I did not."

6 MR. PAGE: Your Honor, I object to that use of the
7 deposition. Her testimony was not that she tried to do it, but
8 that she reviewed other people's materials, and that deposition
9 statement there did not contradict her statements.

10 THE COURT: The question on the record that
11 Mr. Jorgensen asked, I thought had to do with an attempt to
12 quantify the type of manure. Just one second.

13 MR. PAGE: I believe the question, if I heard it
14 correctly was, did she attempt to quantify it.

15 THE COURT: You have not determined the volume of
16 manure deposited by each type -- I can't make it out -- of the
17 watershed.

18 MR. JORGENSEN: I'm actually reading from a little
19 script. So it's, "You did not attempt to quantify the volume
20 of manure deposited by each type of animal in the watershed,
21 did you?" And then the direct response is 72, Lines 19 to 21.

22 THE COURT: Overruled.

23 Q. (By Mr. Jorgensen) Dr. Harwood, did you attempt to
24 quantify the volume of bacteria deposited by pets in the
25 watershed?

1 A. No.

2 Q. Did you attempt to quantify the volume of bacteria, I'm
3 not talking about the manure, but the bacteria in the manure
4 deposited by humans in the watershed?

5 A. No.

6 Q. And you don't know whether anyone else on the State's team
7 did any of these things, do you?

8 A. There was -- material was reviewed as to the relative or
9 the amounts of animal feces that would be deposited in or that
10 could contribute to impairments in the watershed, but that
11 material -- that research was not done by me.

12 Q. And you're talking about the amounts of feces, not the
13 volume of bacteria in the feces?

14 A. Correct.

15 Q. You didn't study the effects of urban runoff on bacterial
16 loading in the watershed, did you?

17 A. No.

18 Q. All right. We've covered the things that you did and that
19 you didn't do. Let's move to the science of microbial source
20 tracking generally. Now, microbial source tracking, it's a
21 young science; is that right?

22 A. I would say it started in 1996 or so, depending on where
23 you start, so, yeah, it's 20 years old.

24 Q. Would you agree that it's still developing?

25 A. Yes, much as all of microbiology is developing.

1 Q. And if you are wrong on that point, does it call your
2 opinion in this case into question?

3 A. No.

4 MR. JORGENSEN: Your Honor, may I approach the screen?

5 THE COURT: You may.

6 Q. (By Mr. Jorgensen) Doctor, I think I mentioned before,
7 it's kind of an embarrassing case. I'm just going to get to
8 the embarrassing questions. We talked before over here at the
9 left about a number of factors that kill bacteria in the
10 environment. Do you remember that?

11 A. Yes.

12 Q. Now, if a cow is standing in a stream and it relieves
13 itself directly into the stream, hot and wet so to speak, do
14 those bacteria face the same environmental stresses before
15 making it to the stream?

16 A. Compared to?

17 Q. Compared to the ones spread on the field?

18 A. They would be different environmental stresses.

19 Q. They don't face the risk of being killed by the sunlight
20 on the field, do they?

21 A. No, but they might face a lot more risk from starvation.
22 So the stresses could be different.

23 Q. Do you agree that bacteria that make it into the stream
24 can make it into the sediments and then have a greater
25 survivability rate in the sediments?

1 A. That can happen.

2 Q. Now, would that be true if cattle deposit hot and wet into
3 the stream, also be true for ducks?

4 A. Yes, anything that gets deposited or that gets run off
5 into the stream can have that fate.

6 Q. When you take a sample from a stream, isn't it important
7 to know how close the contributor was to where you took the
8 sample, whether it's two miles away over dry land or ten yards
9 away in the water?

10 A. Usually we don't have that detailed knowledge, but if you
11 did have the knowledge, that would be good.

12 Q. And it would be good because it would make a big
13 difference on whether the bacteria could survive and prosper
14 and make it to the stream?

15 A. We really don't usually split hairs that much. We're
16 looking at a big picture. We're looking at big pictures and
17 the inputs over large land areas. So that isn't really -- that
18 is splicing and dicing. How close the animals are isn't really
19 part of the picture.

20 Q. Dr. Harwood, do you see all the birds in this picture or
21 do you see that there are many birds in the picture? I'm not
22 asking you to play Where's Waldo and find them all.

23 A. They look like Christmas ornaments. Those are birds, I
24 guess.

25 Q. Okay. The Christmas ornament looking things, those are

1 IN THE UNITED STATES DISTRICT COURT
 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,)
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 9 TYSON FOODS, INC., et al.,)
)
 10 Defendants.)

11
 12
 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 FEBRUARY 22, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME IV

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

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February 22, 2008

THE COURT: Dr. Olsen, if you will retake the stand.
Mr. George, you may resume.

MR. GEORGE: Thank you, Your Honor.

1 what you mean.

2 Q. "Well, I can ask it a different way. Is it your position
3 that those bubba poultry farmers out there don't know what
4 they're doing when they enter into contracts to be contract
5 growers and somebody ought to stop them from doing it?

6 A. "I'm not saying they should be stopped from doing it.
7 They should go in with their eyes open about the true economic
8 return to contract poultry production and there's very little
9 information on that."

10 MR. BULLOCK: Judge, this appears to be well beyond
11 the appropriate use of a deposition in order to impeach. They
12 asked him whether he used the term bubba. We covered that very
13 early and now they just seem to be playing depositions because
14 they like the deposition.

15 MR. ELROD: I'm through, Your Honor.

16 THE COURT: Frankly, there toward the tail end,
17 frankly when your objection arose, I think it has to do with
18 the subject that you raised. So overruled. Go ahead.

19 Q. (By Mr. Elrod) Now, let's get into the substance of your
20 testimony, Dr. Taylor. You agree with me, that in all the
21 travels that you have made and all the speeches that you've
22 given and all of your knowledge of the poultry industry
23 throughout the United States, you know of no one who treats
24 litter as a hazardous substance?

25 MR. BULLOCK: Objection to the relevance. We have

1 claimed that it is a waste. We haven't said that it's a
2 hazardous waste under the act, Judge.

3 MR. ELROD: Well, if that's the State's position, then
4 I'll withdraw --

5 THE COURT: But is it an objection to the relevance or
6 beyond the scope of direct?

7 MR. BULLOCK: It's also beyond the scope. I was
8 getting it from two places here, and I apologize

9 THE COURT: Sustained.

10 MR. ELROD: Your Honor, I guess my point is that if
11 that's the State's position, then we've disposed, perhaps, with
12 a great deal of issues in this lawsuit. If their position is
13 that litter is not a hazardous substance, then that's great.

14 THE COURT: Well, I think ordinarily it's just beyond
15 the scope of the testimony of this witness, I believe.

16 MR. BAKER: Just to be clear, Your Honor, we have not
17 said that poultry waste is not a hazardous substance. We're
18 talking RCRA now, solid waste versus hazardous waste, very
19 different concept.

20 THE COURT: You've educated me. I appreciate that. I
21 still frankly need some education from both of you on that.
22 It's an interesting legal issue. But in any event, Mr.
23 Bullock's objection is sustained.

24 Q. (By Mr. Elrod) Dr. Taylor, in the conduct of your
25 investigation of the poultry industry, have you become aware

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 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

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 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 MARCH 3, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME V

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 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

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21 PROCEEDINGS

22 March 3, 2008

23 THE COURT: Please be seated. Do I understand
 24 correctly that the plaintiffs are prepared to put on their
 25 witness out of time?

1 problems with bacteria and he said no.

2 Q. Mr. Young, are you aware of the fact that -- strike that,
3 Your Honor. What's your understanding of what occurs with
4 poultry litter in the Illinois River Watershed in terms of how
5 it's used?

6 A. It's used as a source of nutrients.

7 Q. Is there a market for poultry litter in Arkansas, sir?

8 A. Yes, there is.

9 Q. Would you consider that a vibrant market?

10 A. Vibrant market in Oklahoma as well.

11 Q. Sir, does Arkansas regulate poultry litter applications?

12 A. Yes, we do.

13 Q. Does Arkansas regulate poultry litter applications that
14 occur within the Illinois River Watershed?

15 A. Yes, we do.

16 Q. Does the State of Arkansas view poultry litter as a
17 discarded waste?

18 A. No, quite the opposite. When our general assembly enacted
19 our regulatory program in 2003, they went to some length to
20 make it clear that there was economic value from a source of
21 nutrients to chicken litter.

22 Q. Mr. Young, do the Arkansas regulations allow, in some
23 instances, contract growers or third parties to land apply
24 poultry litter on fields that already have sufficient agronomic
25 levels of phosphorus?

1 contracts will be either three or seven years in duration, the
2 only exception being if a grower has asked for some reason to
3 have a lesser duration contract.

4 Q. Dr. Pilkington, is there a competitive market for the
5 services of contract growers or do they always stay with the
6 first integrator they contracted with?

7 A. There is a competitive market. They routinely switch.

8 Q. Are you aware of instances in northeast Oklahoma and
9 northwest Arkansas of contract growers switching from one
10 company to another?

11 A. Yes.

12 Q. Sir, do contract growers actually purchase birds from
13 Tyson and then sell them back at the end of the flock?

14 A. No, we retain ownership at all times.

15 Q. Who owns the land or the real property where poultry
16 houses used by contract growers to raise poultry are located?

17 A. The contract grower.

18 Q. Does Tyson pay for or finance the construction of poultry
19 houses used by contract growers?

20 A. No, the growers secure their own financing.

21 Q. Are you aware that some contract growers in northeast
22 Oklahoma and northwest Arkansas also have litter storage
23 facilities on their properties?

24 A. Yes.

25 Q. And who pays for the construction of those litter storage

1 facilities?

2 A. The grower.

3 Q. Who pays for the maintenance of poultry houses located on
4 contract growers' properties?

5 A. The contract grower.

6 Q. Who pays the utilities such as water, sewer, gas, electric
7 required to operate poultry houses on contract grower
8 properties?

9 A. The contract grower.

10 Q. Other than the actual physical barn or poultry house, is
11 there any other equipment that a contract grower needs to raise
12 poultry?

13 A. Well, they have to outfit that barn, so they'll have
14 waterers, feeders, fans, hoppers and the like so, yes.

15 Q. And as between the integrator such as Tyson and the
16 contract grower, who buys that equipment?

17 A. The contract grower.

18 Q. Who supplies the labor needed to operate a poultry farm?

19 A. The grower does.

20 Q. Are you aware, sir, of instances in which contract growers
21 actually hire third parties to provide labor?

22 A. I would say that's actually very common.

23 Q. When that occurs, who pays that person's wages, is it the
24 contract grower or the integrator?

25 A. The contract grower does.

1 Q. Sir, where do contract growers get the feed that is given
2 to the birds?

3 A. Tyson delivers that to the farm.

4 Q. Why doesn't Tyson let contract growers select and purchase
5 their own feed from whatever source?

6 A. Well, I don't think we've ever been asked to do that. I
7 really don't think a grower would want that. Outside of that,
8 I guess there are a couple of reasons. One, there are some
9 regulations around, mainly through packers and stockyards, that
10 growers that ultimately settle in a competitive fashion, which
11 these typically do, have to be treated similarly. So we have
12 to ensure that the feed that is going to those farms is
13 consistent, say, from grower A to grower B, so that's certainly
14 one reason. Also there's some regulations around FDA and/or
15 USDA that stipulate that certain things that go in the feed are
16 known and controlled and so that's why we provide that feed.

17 Q. Dr. Pilkington, the Judge has heard about something
18 referred to as bedding that's used in poultry houses. Are you
19 familiar with that term?

20 A. Yes.

21 Q. And what is bedding?

22 A. Normally -- in this area most of the time that will either
23 be wood shavings or very commonly rice hulls. And it's put
24 down before birds are delivered to a farm as the surface that
25 they'll be walking on and bedding down in.

1 Q. Does Tyson provide contract growers with bedding or
2 purchase it on their behalf?

3 A. No, they secure that.

4 Q. Dr. Pilkington, there's been some testimony in this case
5 about a group of individuals referred to as either fieldmen or
6 service techs. Are you familiar with those positions?

7 A. Yes, I am.

8 Q. What role, if any, do service techs or fieldmen play in
9 the process of raising poultry on contract growers' farms?

10 A. Well, they really don't raise poultry on the farms. What
11 they do commonly is -- let's say on average they'll be at a
12 farm once a week. While they're there, they're checking on the
13 welfare of the birds, they're making sure that there is, in
14 fact, feed, sufficient feed to make it until the next delivery
15 is supposed to come and generally looking at the conditions of
16 management on the farm. And if a grower happens to be there,
17 offering any advice or any answers to questions they may have.

18 Q. You use the term advice, give me some examples of the type
19 of advice that might be given by a service tech or fieldman to
20 a contract grower.

21 A. One might be -- it's fairly simplistic, but the height of
22 the feeders or the waterers, maybe some advice on how much
23 ventilation to either increase or decrease, when birds should
24 be turned out into the full house because they start in just
25 half the house. There's usually a curtain dropped halfway, so

1 at what age they might be released. I guess those are some
2 good examples.

3 Q. Dr. Pilkington, do you have an understanding of what
4 contract growers generally do with litter cleaned out of their
5 houses in northeast Oklahoma and northwest Arkansas?

6 A. Yes.

7 Q. And what is your understanding of what occurs?

8 A. In general, they either use it as fertilizer or sell it to
9 another party.

10 Q. Dr. Pilkington, if a contract grower also raises cattle or
11 has hay pastures where they are producing the hay in addition
12 to raising poultry, do the companies or their service techs
13 give advice or suggestions to contract growers about those
14 operations, cattle operations in particular?

15 A. No, our service techs, I mean, that's really not -- we're
16 not in the business to raise hay or raise cows so, no.

17 Q. Dr. Pilkington, does Tyson spread or land apply litter in
18 the Illinois River Watershed?

19 A. No.

20 Q. How many litter spreading trucks does Tyson Foods own?

21 A. None.

22 Q. Do the companies or service techs monitor or give advice
23 on the land application of poultry litter?

24 A. No, the -- our contract stipulates that the regulations
25 will be followed, but outside of that, there is not advice

1 given, no.

2 Q. Does Tyson audit contract growers for compliance with the
3 laws?

4 A. No, there is no audit.

5 Q. Okay. Why not?

6 A. Well, again, our contract really lays out what our
7 expectations are or actually the expectations of both parties
8 in that contract when it comes to regulations around -- well,
9 around, in this case specifically poultry litter. What we are
10 there to do is to see over the efficient growth of the birds.
11 And as long as they're following the terms of the contract,
12 that's not why we're there.

13 Q. Does Tyson mandate or require poultry farmers to clean out
14 litter on a regular schedule?

15 A. No, they typically will clean out when they have a need.
16 And often that will correlate or correspond, excuse me, to when
17 they want to fertilize certain fields.

18 Q. When a contract grower has had his house cleaned out and
19 he decides to sell his poultry litter to a third party, does
20 Tyson Foods receive any of the proceeds of that sale?

21 A. No.

22 Q. Does Tyson tell poultry growers in the watershed where to
23 land apply poultry litter?

24 A. No.

25 Q. Does Tyson tell contract growers or third parties in the

1 watershed when to spread poultry litter?

2 MR. GARREN: Judge, I've been fairly lenient, but
3 these are very leading questions. I think they can be asked as
4 to when or where.

5 THE COURT: With regard to that last question, I don't
6 believe it's leading. Overruled. Go ahead.

7 MR. GEORGE: Thank you, Your Honor.

8 Q. (By Mr. George) Do you recall the question,
9 Dr. Pilkington?

10 A. No, I don't.

11 Q. Does Tyson tell poultry growers or third parties in the
12 watershed when to spread poultry litter?

13 A. No.

14 Q. Does Tyson Foods receive notification of the locations and
15 amounts where poultry litter by contract growers or third
16 parties may be applied?

17 A. No.

18 Q. Dr. Pilkington, have you or your family spent much time in
19 the Illinois River Watershed?

20 A. We've spent some time. I've fished the Illinois River
21 before. In terms of my family, I have -- part of my children,
22 my older nine-year-old twins were at New Life Ranch last year.
23 They're signed up to go again this year. So, yes, we've spent
24 time in it.

25 Q. You mentioned that you fished, did you say the Illinois

1 A. Oh, almost 50 years.

2 Q. Tell His Honor what you do for a living.

3 A. Raise chickens and cows.

4 Q. Could you go into a little more detail about what you do?
5 Okay. How many chickens do you grow at one time?

6 A. 120,000.

7 Q. All right. Do you have houses, what are called poultry
8 houses?

9 A. Yes.

10 Q. How many of those do you have?

11 A. Six.

12 Q. Do you have land?

13 A. Yes.

14 Q. How much land do you have?

15 A. I've got about 200 acres of my own and I rent about 200
16 acres.

17 Q. Altogether do you grow on 400 acres?

18 A. Yes.

19 Q. What do you grow?

20 A. Hay and pasture.

21 Q. How many head of cattle do you run?

22 A. Around 200 cows.

23 Q. Is it a cow-calf operation?

24 A. Yes.

25 Q. About how many cows do you sell every year?

1 A. 150 to 180.

2 Q. Is your operation, your chicken operation and your farming
3 operation and your ranching operation, do they go together?

4 A. Yeah.

5 Q. And if so, how do they work together?

6 A. Well, we use the chicken litter for fertilizer.

7 Q. Go ahead. Then that fertilizes what?

8 A. Fertilizes the pasture and the hay ground and we can run
9 more cattle.

10 Q. All right. If the cost of poultry operations increases
11 for some reason, how does that impact you?

12 A. You mean the cost of my producing poultry?

13 Q. Yes.

14 A. Well, I just make less money.

15 Q. Now, do you have a contract with Tyson?

16 A. Yes.

17 Q. How long have you been a contract grower for Tyson?

18 A. Ten or eleven years.

19 Q. There was some testimony from the prior witness about a
20 standard form contract. Were you able to hear that from where
21 you were?

22 A. Yes.

23 Q. In your own terms, is your contract you signed with Tyson
24 a standard form contract?

25 A. Just a standard contract.

1 Q. Did you negotiate any of the terms?

2 A. No.

3 Q. Are there other contracts that you enter into from time to
4 time or have in the past that you don't negotiate the terms on?

5 A. Oh, yes.

6 Q. Like what?

7 A. Oh, insurance. I've --

8 Q. Okay, fair enough. Did you negotiate the terms when you
9 bought a house, bought a car?

10 A. Not really.

11 Q. Okay. Now, there's some testimony from Mr. Pilkington
12 that Tyson owns the birds, provides the feed, provides
13 technical services, vet services and the like. Could you hear
14 that testimony?

15 A. Yes.

16 Q. Do you agree or disagree with that?

17 A. I agree.

18 Q. Now, there was some talk about a field -- I don't know the
19 proper terms. Is it called a field service person from Tyson
20 that comes out from time to time?

21 A. We call them fieldmen.

22 Q. Fieldmen.

23 A. Tyson calls them service techs.

24 Q. How often does a fieldman from Tyson come out to your
25 farm?

1 A. Oh, supposedly weekly, but that's not -- it's not really a
2 set deal. Sometimes they won't be out there for two or three
3 weeks.

4 Q. When they come out there, do you always talk to them when
5 they come?

6 A. Well, if we're there, but not always, no.

7 Q. When you are there and the man from Tyson comes out, what
8 do you talk about in general?

9 A. Oh, he'll look in on -- open the door of the chicken
10 houses and look at the mortality chart. And then we'll usually
11 talk about cows or grandkids or something like that.

12 Q. How much time do you spend with the fieldman talking about
13 the chickens when he comes out on average?

14 A. Fifteen to 30 minutes.

15 Q. What kind of things other than the fact that some birds
16 have died, I guess that's what you meant by mortality rate?

17 A. Yeah, I mean, that's normal. You've got mortality.

18 Q. Right. Other than talking about the mortality rate, what
19 else, what other kinds of things do you talk to him about?

20 A. Oh, we might ask him to look in and see how they look.
21 And other than that, you know, he'll stick his head in there
22 and say they look all right.

23 Q. Now, do you have somebody that helps out on your farm?

24 A. Yes.

25 Q. Did you hire this person?

1 A. Yes.

2 Q. Has anybody but you got the ability to fire them?

3 A. No.

4 Q. I mean excluding your wife?

5 A. Well, she does.

6 Q. All right. From the standpoint of who gives this man or
7 woman, whoever it is, this worker, who tells them what to do
8 every day?

9 A. Me or my wife.

10 Q. Does Tyson ever give him instructions, him or her
11 instructions?

12 A. Not that I know of.

13 Q. Have you ever seen or observed that?

14 A. No.

15 Q. Now, let's talk about poultry litter. Were you in the
16 back of the courtroom when Dr. Lawrence testified this morning?

17 A. Yes.

18 Q. I hope what I'm stating this correct, but I believe that
19 he said that he's familiar with the fact that litter is applied
20 an inch or so deep on the ground. From what you know and, of
21 course, you've lived here most of your life, is that an
22 accurate statement?

23 A. No.

24 MR. HAMMONS: Objection, Your Honor. I'm sorry, Mr.
25 Ryan, but I believe that's a mischaracterization of Dr.

1 Lawrence's testimony.

2 THE COURT: Overruled.

3 Q. (By Mr. Ryan) Tell us the thickness which poultry litter
4 is after it's been applied on the ground.

5 A. Oh, it will be -- it will just be a skiff -- I mean, the
6 ground won't be covered with it. It will just be a skiff of
7 it.

8 Q. A skiff is like a what?

9 A. Like a real light snow.

10 Q. Fair enough. Is that how you apply it on your property?

11 A. Yes.

12 Q. Have you ever seen anybody apply it anywhere near an inch
13 thick?

14 A. No.

15 Q. I think maybe you've already answered this question, but
16 the chicken litter that is produced in your poultry houses, do
17 you sell any of it?

18 A. I sell a little bit, but I use most of it myself.

19 Q. About how much of it do you sell?

20 A. Oh, maybe 20 or 30 loads a year maybe, not very much.

21 Q. Is there a market for poultry litter?

22 A. Oh, yeah.

23 Q. How much does it sell for?

24 A. I can sell it in my houses without me cleaning it for
25 anywhere from 5 to \$10 a ton. I can clean it myself and haul

1 it and spread it and get about \$100 a truck load for it.

2 Q. Who makes the decision with respect to when you apply the
3 chicken litter in your farming operation?

4 A. I do.

5 Q. And who makes the decision as to how it's applied?

6 A. I do.

7 Q. In terms of how much, who has the say-so on that?

8 A. The Natural Resources Commission in Arkansas.

9 Q. We'll talk about that in a moment. Who makes the decision
10 whether you sell it or whether you apply it to your land?

11 A. I do.

12 Q. Is the topic of poultry litter, the how, when, where and
13 whatnot, ever discussed between you and the Tyson fieldman?

14 A. No.

15 Q. Let's talk about these Arkansas regulations. The Court
16 has heard a little bit about it, but do you recall when the
17 State of Arkansas passed some legislation regarding application
18 of poultry litter?

19 A. Do I recall when?

20 Q. Yeah, when they did that about?

21 A. Five or six years ago, something like that.

22 Q. And what is your understanding of what it requires of you?

23 A. Well, I'm supposed to follow their recommendations on what
24 they say I can put.

25 Q. So let's take the last time before you applied poultry

1 litter. What did you have to do before you could apply poultry
2 litter to your property, to your land, your pasture?

3 A. I had to have a nutrient management plan.

4 Q. And how did you go about getting that?

5 A. You call the whatever office that is.

6 Q. Is it the Natural Resources Commission?

7 A. The Natural Resource Commission. They come and take soil
8 samples and test the soil and then they make a management plan
9 that tells you how much you can put and where you can put it,
10 which field you can put and how much.

11 Q. Now, is this a written plan?

12 A. Yes.

13 Q. So after they come and they test the soil, you get back a
14 document?

15 A. Yes.

16 Q. All right. Now, when you get back this plan or in your
17 case, the plan that you received, did it have the same
18 application rate to all the various pieces of property that you
19 have, these 400 acres, or is it different?

20 A. It's different.

21 Q. How is it different? I'm not asking you to memorize your
22 plan, but just in general how is it different?

23 A. It varied from the least I could put on any one field was
24 two tons to the acre and I think the most was three and a half
25 tons to the acre.

1 Q. So the plan is individualized for the individual fields?

2 A. Yes.

3 Q. How many different fields did they consider you to have?

4 A. Well, I don't know.

5 Q. More than one?

6 A. Oh, yeah. Twelve or so, maybe more.

7 Q. Do you have an understanding from your dealings with the
8 Natural Resources Commission as to what is taken into account
9 to determine how much you can apply?

10 A. Yes.

11 Q. What is your understanding?

12 A. Well, there's a -- you've got to stay so far from a
13 property line, from a road, from a stream. So much slope, you
14 can't apply on if it's a certain amount of slope. But the
15 management plan will give you all that information.

16 Q. All right. Now, why do you apply poultry litter to your
17 pastureland?

18 A. To make more pasture.

19 Q. How do you know it works?

20 A. Well, I've seen it all my life. And you take a field and
21 any spot you miss, you can tell it.

22 Q. How can you tell it?

23 A. The grass don't grow as much.

24 Q. How much less does it grow?

25 A. A lot less, 50 to 75 percent less.

1 Q. Do you own the litter, the poultry litter?

2 A. Well, yes.

3 Q. Is that important to your operations?

4 A. Yes.

5 Q. Has it always been that way?

6 A. Yes.

7 Q. Now, you said you could tell -- and I want to make sure I
8 understood this. You said you could tell by the way in which
9 you applied the poultry litter whether it was working, whether
10 it was working as a fertilizer. And I'd just like to
11 understand better how you know it's working. You say you see
12 it can grow better, but why don't you apply it everywhere to
13 where it grows evenly everywhere?

14 A. Well, it just, it don't spread perfectly evenly. Right
15 behind your spreader, it will be a little bit heavier than it
16 will out to the sides. And right where your spreader runs, the
17 grass will be a little bit heavier.

18 Q. Is a spreader a vehicle that you pull behind your truck?

19 A. No, I have spreader beds on trucks.

20 Q. All right. And do you make circular -- when you are going
21 around the field, do you make circular passes?

22 A. Yes.

23 Q. So are there corners that the spreader won't put down
24 poultry litter?

25 A. Yes.

1 Q. All right. Tell His Honor what the difference is between
2 what happens to the pastureland which the poultry litter is put
3 down on and then, let's say, in those corners where the
4 fertilizer didn't reach.

5 A. Well, where you miss a corner, you'll have a triangle
6 shaped piece that the grass isn't near as good.

7 Q. Now, what do you pay for poultry litter?

8 A. Well, I have my own, but I guess it costs me what I can
9 sell it for.

10 Q. But you don't pay anything; right?

11 A. No.

12 Q. Now, how much -- do you know how much commercial
13 fertilizer costs?

14 A. It's in the neighborhood of \$600 a ton.

15 MR. RYAN: Your Honor, may I approach the easel,
16 please?

17 Q. (By Mr. Ryan) \$600 a ton for commercial fertilizer;
18 correct? Is that right?

19 A. That's right.

20 Q. Now, how far will that -- how many acres will that ton
21 provide for in terms of fertilization?

22 A. About ten acres.

23 Q. So that would be ten acres for a ton; right?

24 A. Yes.

25 Q. Or 200 pounds per acre; is that right?

1 A. That's right.

2 Q. What did you say the cost of poultry litter is?

3 A. Well, I have my own.

4 Q. Right, but if it's bought and sold in the watershed, what
5 does it cost approximately?

6 A. Seven, \$8 a ton, in that area.

7 Q. Seven dollars a ton. And then how far -- what did you say
8 you apply, two and a half? I can't remember what you said, two
9 or three acres, two or three tons to the acre?

10 A. I try to put a ton to every -- around three acres is what
11 I try to do, two to three acres.

12 Q. I'm sorry. How many tons per acre, poultry litter?

13 A. Two to three tons per acre.

14 Q. So if we use two and a half times seven, see if my math is
15 right. That would be \$17.50 per acre; correct?

16 A. Right.

17 Q. Now, you said you'd do 400 acres?

18 A. Yes.

19 Q. So if we were talking about 600 tons for commercial
20 fertilizer, 200 pounds per acre, that would be \$60 per acre;
21 right?

22 A. Yes.

23 Q. Commercial; is that right?

24 A. I think so.

25 Q. So the difference then between commercial is approximately

1 \$42 a ton or thereabouts. Maybe up or down some depending on
2 the price of poultry litter, depending on the price of
3 commercial fertilizer, but you're talking about a big
4 difference?

5 A. Yeah.

6 Q. Now, if we multiply this times 400 acres --

7 THE COURT: All 400 acres in production grass?

8 THE WITNESS: Yes, all except for maybe a little patch
9 of timber here and there.

10 Q. (By Mr. Ryan) If all of that was put into the difference
11 cost between putting commercial fertilizer and poultry litter,
12 400 acres, we're talking about \$17,000?

13 A. Yeah.

14 Q. How would \$17,000 impact your operation?

15 A. Well, it would hurt.

16 Q. Would you be able to continue operations or not?

17 A. Oh, I might be able to continue, but it would hurt bad.

18 Q. Now, if this Court should enter an injunction stopping all
19 poultry litter in the watershed, are you with me?

20 A. Yeah.

21 Q. I know you're not an economist, but what do you think that
22 would do to the cost of poultry?

23 MR. HAMMONS: Your Honor, I have to object to the
24 relevance of this question.

25 THE COURT: Sustained. Rephrase.

1 MR. RYAN: That's all I have, Your Honor. Thank you.

2 THE COURT: Cross-examination.

3 CROSS-EXAMINATION

4 BY MR. HAMMONS:

5 Q. May it please the Court. Good afternoon, Mr. Robinson.
6 Trevor Hammons for the State of Oklahoma. You said you have
7 six poultry houses; is that correct?

8 A. Yes.

9 Q. You do own the houses?

10 A. Yes.

11 Q. Are they currently paid for or do you still owe on them?

12 A. I still owe on it.

13 Q. Okay. How many birds per house do you have?

14 A. Around 20,000.

15 Q. How many flocks per year do you have?

16 A. Five and a half.

17 Q. Five and a half. Will you have a flock in each house or
18 does it rotate or does it just depend?

19 A. You mean are they all the same age, do they go in and out
20 the same?

21 Q. Yes, sir.

22 A. They all go in and out at the same time.

23 Q. So you're going to have 120,000 chicks of the same age at
24 one time?

25 A. Yes.

1 Q. Have you attended any other educational or informational
2 type courses regarding poultry litter application?

3 A. Not that I remember.

4 Q. Has Tyson given you any guidance or instructions regarding
5 the disposal of poultry litter?

6 A. Nothing except that I just have to follow the local and
7 state laws.

8 Q. Does Tyson ever tell you to clean out your houses?

9 A. They never have.

10 Q. How often do you clean out your houses?

11 A. One to -- anywhere from one to three years.

12 Q. Do you cake out?

13 A. Yes.

14 Q. What does cake out mean, sir?

15 A. Well, you take out the wet cake litter off the top, and it
16 leaves the dry litter in the houses.

17 Q. What do you do with that wet cake litter?

18 A. I have a big barn I put it in and then eventually I'll
19 spread it.

20 Q. Okay. So you clean out -- you don't clean out between
21 flocks; is that correct?

22 A. Not a complete clean out, no.

23 Q. You will do a complete clean out maybe once every three
24 years you said?

25 A. Anywhere from one to three years.

1 Q. After you take that -- you do a full clean out or the
2 caking out of the material of the poultry litter, is that
3 material still used in the process of growing chickens?

4 A. I don't understand.

5 Q. The stuff that you take out of the house of poultry
6 litter, do you need that material to raise chickens at the
7 point that you take it out of the house?

8 A. No.

9 Q. You testified, sir, that you land apply; correct?

10 A. Yes.

11 Q. And you also sell some; is that correct?

12 A. Yeah, a little bit.

13 Q. And you apply on your land; is that correct?

14 A. Yes.

15 Q. Do you ever give it away to any of your neighbors?

16 A. No.

17 Q. And you do have an animal waste management plan; is that
18 correct?

19 A. Yes.

20 Q. When did you first get an animal waste management plan,
21 sir?

22 A. I think I got my first one a little over five years ago.

23 Q. Okay. And do you take a soil test, is that -- let me
24 strike that. Does that animal waste management plan require
25 you to take a soil test?

1 A. No.

2 Q. It does not require you to?

3 A. It does not require me to.

4 Q. Have you taken a soil test on your land?

5 A. The Natural Resources Commission has.

6 Q. Do they do that annually?

7 A. I don't know how often they do it. I just got a new
8 updated plan and they took the samples last summer sometime.

9 Q. Okay. So five years ago -- just to understand your
10 testimony, five years ago you got your first animal waste
11 management plan. And then just this last summer, you got
12 another soil test for another animal waste management plan; is
13 that correct, sir?

14 A. Yes.

15 Q. Did you do any soil testing in between that five-year
16 period other than that first soil test?

17 A. Myself, I didn't. The NRCS might have, I don't know.

18 Q. So you don't know if the land that you have applied
19 poultry litter, other than that first soil test five years ago
20 and the one recently, you don't know if any soil tests have
21 been performed on that property; is that correct?

22 A. No, I don't.

23 Q. Do you know what the results of your last soil test were?

24 A. Yes.

25 Q. Could you describe those to me, do you remember just

1 generally?

2 A. It gives the application rate, how much we can put on each
3 field.

4 Q. Yes, sir.

5 A. And the least I could put on any field was two ton to the
6 acre.

7 Q. Okay.

8 A. And it went from there to three and a half, the most I
9 could put was three and a half ton to the acre.

10 Q. Are you familiar, sir, with the term soil test phosphorus
11 or STP?

12 A. No.

13 Q. Do you know what your fields are -- what nutrient your
14 fields are deficient in?

15 A. Not without looking at my soil test, no.

16 Q. Are you actually applying for nitrogen or are you applying
17 for phosphorus?

18 A. For both, I guess.

19 Q. Do you know specifically these fields, if there's a
20 phosphorus need or is there a nitrogen need?

21 A. In my nutrient management plan, it tells.

22 Q. Do you remember specifically?

23 A. But I don't remember specifically, no.

24 Q. Okay. The Judge asked you this question but, I'm sorry, I
25 didn't hear it correctly. Do you apply on all 400 acres of

1 your field?

2 A. All that I can legally apply to, yes.

3 Q. What is legally apply to?

4 A. Well, you've got a buffer zone. You've got to stay away
5 from property lines and creeks. And if it's too steep, you're
6 not supposed to spread on it.

7 Q. Okay. Why do you sell it?

8 A. Well, I usually sell it to a friend or something and I
9 just sell it to be a friend usually.

10 Q. Is it because you can't use it on your property?

11 A. No.

12 Q. And you testified you may give it to a friend. Have you
13 heard of BMPs?

14 A. Yes.

15 Q. Do you sell it to them?

16 A. I never have.

17 Q. Do you know where the litter goes that you do sell?

18 A. Yes.

19 Q. Where does it go, sir?

20 A. Well, it will go on another farm because I spread it. I
21 mean, I sell it and spread it both.

22 Q. So you actually will sell it to somebody and go to
23 their -- do you haul it yourself to that other farm?

24 A. Yes.

25 Q. And then you spread it on somebody else's field; is that

1 correct?

2 A. Yes.

3 Q. Do you see -- before you spread it, do you look at their
4 soil test or their animal waste management plan?

5 A. Yes.

6 Q. And you apply it consistent with that animal waste
7 management plan?

8 A. Yes.

9 Q. Okay. Does it stay -- how far do you go?

10 A. What do you mean?

11 Q. Well, if you're going to sell it, do you go to eastern
12 Arkansas?

13 A. Oh, no. It will be close, within five miles.

14 Q. Do you ever go into Oklahoma to apply it?

15 A. No.

16 Q. It's always in Arkansas. Mr. Ryan talked a little bit
17 about this chart that he drew up here. How much commercial
18 fertilizer have you bought in the last five years?

19 A. None.

20 Q. How much have you bought in the last ten years?

21 A. None.

22 Q. Okay. How do you know how much commercial fertilizer
23 costs?

24 A. Well, from things I've read and things I've heard.

25 Q. But you don't know what it's selling for at the local

1 IN THE UNITED STATES DISTRICT COURT
 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,)
 4 W.A. DREW EDMONDSON, in his)
 capacity as ATTORNEY GENERAL)
 5 OF THE STATE OF OKLAHOMA,)
 et al.)
 6)
 Plaintiffs,)
 7)
 V.) No. 05-CV-329-GKF-SAJ
 8)
)
 9 TYSON FOODS, INC., et al.,)
)
 10 Defendants.)

11
 12
 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 MARCH 7, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME VI

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

19
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17 PROCEEDINGS

18 March 7, 2008

19 THE COURT: The defendants may call their next
20 witness.

21 MR. RYAN: Your Honor, can I take up a couple of
22 housekeeping matters?

23 THE COURT: Yes, sir. I guess we're set to go Monday
24 and Tuesday. We're trying to clear the decks and apparently we
25 have Wednesday afternoon available.

1 Q. So what do you conclude in terms of whether the chicken
2 toxin producing E. coli 0157H7 is going to be sourced from
3 poultry?

4 A. I say within reasonable medical probability and reasonable
5 epidemiologic probability chickens ain't the source.

6 Q. Okay. So what are the pathogens then that we should be
7 concerned about with respect to poultry?

8 A. We have to focus on Salmonella and Campylobacter, the
9 established organisms that have a clear poultry reservoir.

10 Q. Well, let's just go back to E. coli for a moment even
11 though you said they're not in poultry. I just want to
12 understand -- the term E. coli has been used in this hearing
13 frequently and I want to see if you will distinguish for us the
14 E. coli bacterial indicator as opposed to the E. coli that
15 causes human disease.

16 A. Yes, there are actually about six different diarrhea
17 producing E. coli. This is one of them. It's actually
18 probably the least important, this one is, from a number
19 standpoint worldwide.

20 Q. By this one, you're referring to 0157?

21 A. This 0157H7. It's important now it's in the newspapers
22 because it's produced such serious problems in spinach and
23 lettuce, but it's a relative small problem with 70,000 cases in
24 the U.S. each year. But the E. coli, their indicator organisms
25 are like the E. coli that lives in every colon, every large

1 intestine of everybody in this room and it's what we flush in
2 our toilets, down our toilets every day. And those bugs do not
3 produce disease. They're totally avirulent. They're very good
4 bugs, they make Vitamin K for us and they're very effective in
5 inhibiting pathogens from causing illness. Those are good
6 bacteria.

7 Q. Have you seen in the work that you've done in this case,
8 have you seen any indication that one of these pathogenic
9 E. colis is present in the Illinois River Watershed?

10 A. There's no evidence for this.

11 Q. All right. Now, we've talked about Campylobacter and
12 Salmonella as the two bacterias we focused on. Now, can you
13 tell us how they make one sick, how does that happen?

14 A. Yeah, all microbes have a target organ and that's the
15 organ. Hepatitis is liver. West Nile is brain. These bugs,
16 Salmonella and Campylobacter, infect the gut. You have to
17 swallow them to be sick. That's the only way you can get sick
18 with these bugs is to swallow the organisms. Now, after you
19 say that, there are two factors that are important in
20 infectious diseases when you look at microbes. One is dose,
21 the other is virulence. Virulence has to do with the
22 aggressiveness of the organism, the ability to produce disease
23 in people. It varies by organism and by strain, but those are
24 the two factors, dose and virulence, and then the target organ
25 that has to be infected.

1 Q. Let's talk a little bit about indicator bacteria. And
2 with that, let's bring up slide number 7, please. Could you
3 tell -- I know His Honor has heard quite a bit about bacteria,
4 but just talk to us for a moment about prevalence of bacteria
5 in humans and animals.

6 A. Well, we have -- the human being has a hundred trillion,
7 10 to the 14 bacteria that live in and on the skin, in the
8 mouth, in the GI tract, vagina, all the parts of the body. I
9 mean, we're like the Peanuts character, Pigpen. We've got this
10 cloud of microbes around us and by the way, we like those
11 microbes. They're good for us. When we take antibiotics and
12 knock those bugs down, we are then more susceptible to other
13 problems. So those bugs are great for us. Now, humans are
14 really the most important source for human infection. They're
15 the most important and --

16 Q. Excuse me, I'm sorry.

17 A. And when you -- when I was talking about water sources as
18 the cause of human disease, swimming pools and wading pools are
19 contaminated by other people. And this is why they're at such
20 high risk when they're not properly chlorinated.

21 Q. Is it feasible to have a water standard that says there
22 can be no bacteria in the rivers or the streams or lakes?

23 A. You cannot have that. There are wild animals, there are
24 people, there are reasons why there will be microbes. And I
25 don't think it's a good idea to have a sterile world. And

1 maybe this is where I'm irresponsible again or whatever the
2 term was, you'll remember the word.

3 Q. You're being a little thin skinned here.

4 A. Okay. Well, I'm okay with that. But anyway, if you put a
5 person in a bubble and you don't expose them to microbes until
6 they're adults and put them out in the world, they will die.
7 We are adapted to microbial challenge at all times. You put a
8 kid in a daycare center, they have a couple of episodes of
9 diarrhea, but they have less infections later in life than kids
10 not put in daycare centers. So there's a certain microbial
11 load that we must be exposed to to rev up our body's immunity
12 and to be able to handle infection. And we do not want a
13 sterile world.

14 Q. In that connection, I think what Dr. Lawrence said you
15 were irresponsible about was you said something in your
16 affidavit about the fact that people develop immunity if they
17 are exposed to low level pathogens. Is that a fair statement?

18 A. That's exactly what he --

19 MR. BULLOCK: Objection to form, that's not what he
20 said.

21 MR. RYAN: Well, let's get it exactly right then, Your
22 Honor. I'll rephrase it and we'll put it on the screen.

23 Q. (By Mr. Ryan) Can you see that, Doctor --

24 A. I can see it, but I don't see where it is yet.

25 Q. All right.

1 A. Oh, this is my stuff.

2 Q. This is your affidavit.

3 A. Okay.

4 Q. Page 18, paragraph 14.

5 A. Okay.

6 Q. If you'd read beginning with following, if you can.

7 A. "Following repeated exposure to a specific strain of
8 bacteria, parasite or virus that may be encountered in water,
9 the exposed persons characteristically develop immunity to the
10 organism and related organisms. This is seen in the persons
11 living in mountainous areas of the U.S. and Colorado, Alberta,
12 Utah, who are quite resistant to Giardia as they have been
13 exposed before to the parasite in the local water sources. On
14 the other hand, visitors to the region are susceptible to the
15 parasite and may become ill after exposure to contaminated
16 persons, water or food. Is that enough?

17 Q. Yes. Were you recommending people drink water with
18 microbes in it?

19 A. That's what was taken totally out of context. I was
20 describing what happened, not what was good about it. I was
21 just saying this happens. I wasn't recommending anything.

22 Q. It's just a medical fact?

23 A. Yes, this is what happens.

24 Q. All right. Now, let's turn to indicator bacteria that His
25 Honor has heard about, enterococcus and E. coli and fecal

1 coliforms. But what is the significance of indicator bacteria
2 or its presence?

3 A. Well, it depends -- you know, you can't just jump on it
4 real quick. If it's human feces, that's what you're looking at
5 as indicator organisms, there could well be pathogens there
6 that could cause disease for reasons that we've already been
7 through this morning. The other thing would be if there's a
8 pathogen there in sufficient dose. And water tends not to have
9 high dosage or even moderate doses, it has low doses. So if
10 there's a high -- a relatively high inoculum of organisms
11 there, sufficient inoculum, you could have illness. But the
12 most important part is whether it's human feces or animal feces
13 that's present.

14 Q. Let me change topics altogether here.

15 THE COURT: Before we do that --

16 MR. RYAN: Sure.

17 THE COURT: -- because this is an important subject
18 here and it's not been quite clear to me. Typically the tests
19 for indicator bacteria are not specific to humans versus
20 poultry versus cattle feces; correct?

21 THE WITNESS: Correct.

22 THE COURT: All right. Go ahead.

23 Q. (By Mr. Ryan) Do you know how the EPA developed those
24 standards, what testing they did to develop those standards?

25 A. Yes, there were a couple of places, two specifically where

1 objection. The statement was merely as background, and the
2 objection is overruled. Then go to the substance of the
3 question. You may answer it.

4 A. Well, I think the answers are both correct. There's no
5 smoking gun, so you can say it isn't helpful. On the other
6 hand, it's very helpful because it's what you see with national
7 data and it's not higher than you would expect in these
8 counties in the watershed. So I think it's quite helpful to me
9 and it was helpful to me in arriving at a conclusion that there
10 was not a special problem in these areas. And I think it was
11 helpful to Dr. Crutcher as well.

12 Q. (By Mr. Ryan) Did that information tell you whether the
13 Salmonella or Campylobacter was waterborne or not?

14 A. Not at all.

15 Q. Now, did you review the data of the State's water sampling
16 in this case?

17 A. I did.

18 Q. And what did this tell you in terms of whether there's a
19 risk to human health --

20 A. Well, I looked --

21 Q. -- from the actual water sampling conducted by the State?

22 A. I looked at the actual raw data, I mean, I spent some time
23 on this. And what was found from a lot of microbiology,
24 thousands of samples were looked at for Salmonella and many for
25 Campylobacter and there were very low positivity rates and the

1 counts were extremely low.

2 Q. What does that tell you in terms of, even if it were from
3 a human source, what would that tell you in terms of whether
4 someone was going to get ill?

5 A. I think the counts of these organisms in that water are
6 very, very low, mainly negative. And most of the samples that
7 were positive were edge of field samples and things that are
8 not relevant to any risk.

9 Q. And again, with respect to whatever is there in the water,
10 whatever the level is, does it have to be ingested?

11 A. It does.

12 MR. RYAN: That's all I have, Your Honor.

13 THE COURT: Cross-Examination.

14 CROSS-EXAMINATION

15 BY MR. BULLOCK:

16 Q. Doctor, in preparation for your testimony here today, did
17 you do any testing of any environmental samples at all in the
18 IRW?

19 A. I did not.

20 Q. Okay. Did you sample any waste from poultry barns?

21 A. I did not.

22 Q. Did you ask your -- you're working for the poultry
23 integrators, correct, in this occasion?

24 A. I guess I am.

25 Q. Okay. Did you ask them to do any testing?

1 IN THE UNITED STATES DISTRICT COURT
 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,)
 4 W.A. DREW EDMONDSON, in his)
 capacity as ATTORNEY GENERAL)
 5 OF THE STATE OF OKLAHOMA,)
 et al.)
 6)
 Plaintiffs,)
 7)
 V.) No. 05-CV-329-GKF-SAJ
 8)
)
 9 TYSON FOODS, INC., et al.,)
)
 10 Defendants.)

11
 12
 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 MARCH 10, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME VII

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

19
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PETER JAFFE

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14 PROCEEDINGS

15 March 10, 2008

16 THE COURT: What's on the agenda today, gentlemen?

17 MR. PAGE: Your Honor, I have a minor housekeeping
18 matter, if I may.

19 THE COURT: Yes, sir.

20 MR. PAGE: Your Honor, David Page, for the State of
21 Oklahoma.

22 THE COURT: Yes, sir.

23 MR. PAGE: Friday on cross-examination of Dr. Hennet,
24 I failed to ask for admission of four exhibits.

25 THE COURT: Yes, sir.

1 commonly referred to as poultry litter?

2 A. Yes.

3 Q. To what extent has your research and study dealt with the
4 management of poultry litter?

5 A. I work with it quite a bit.

6 Q. The area where you conducted most of your research, is
7 that known as the Delmarva area?

8 A. I've done a lot of work on the Delmarva Peninsula which is
9 the coastal plain of Maryland, Virginia and Delaware.

10 Q. Is there significant poultry production in that region?

11 A. Yes, very large poultry production area.

12 Q. In that area is poultry litter used for fertilization of
13 crops or pasture?

14 A. Yes, it is.

15 Q. Dr. Coale, does -- in your opinion, does poultry litter
16 have beneficial uses in agriculture?

17 A. Yes, it does.

18 Q. Do we have a demonstrative exhibit to illustrate that
19 point? Show D 80, please. Tell us what Demonstrative 80 is,
20 Dr. Coale.

21 A. This demonstrative on the screen is a list of the nutrient
22 and soil amending properties of poultry litter.

23 Q. Now, the Court has heard multiple times discussions about
24 the macronutrients in poultry litter, so I don't think we need
25 to cover that again. Can you please explain briefly these

1 secondary nutrients, the micronutrients that are listed here?

2 A. Okay. The secondary nutrients are calcium, magnesium,
3 sulfur. They are nutrients that are essential for plants to
4 have access to, enable for them to grow and be productive. But
5 they're not utilized or needed in as large of quantity as the
6 macronutrients, that being nitrogen, phosphorus and potassium,
7 but nonetheless they are essential.

8 Q. Does that apply to the micronutrients?

9 A. Exactly. Micronutrients is the same story. They're
10 categorized in these broad categories simply by how large a
11 quantity they are needed by the plant. So these are essential
12 nutrients, just needed in smaller quantities.

13 Q. Would you briefly identify for the record the
14 micronutrients in poultry litter?

15 A. Iron, boron, magnesium, zinc, copper, molybdenum, chlorine
16 and sodium.

17 Q. You said magnesium.

18 A. Manganese. Excuse me, I misspoke if I said that.

19 Q. Thank you. You have a column over here that says soil
20 amending properties. Dr. Coale, does poultry litter qualify as
21 a soil amendment or soil conditioner?

22 A. Yes, it does.

23 Q. And would you identify for the Court what are the
24 properties commonly associated with poultry litter that can
25 amend or condition soil?

1 A. Well, if we worked on that list, increasing soil pH which
2 is the same as neutralizing soil acidity. That's the same
3 process you'd achieve by adding agricultural limestone to a
4 soil, neutralizing soil acidity. Adding organic matter to the
5 soil and improve soil tilth which is the workability or the
6 structure, if you will, of the soil. As you increase organic
7 matter, you improve the water retention capacity of the soil
8 and promote microbial activity. It promotes aggregation of
9 soil particles, that's simply how the soil particles stick
10 together in larger units which is a positive characteristic.
11 That characteristic promotes water infiltration. It promotes
12 macrofauna, as it says on the list. Those are like earthworms
13 and other larger animals that live in the soil. And porosity
14 which we spoke about earlier today, it helps improve porosity
15 of the soil.

16 Q. All right. Dr. Coale, if forage on a pasture does not
17 need any of the fertilizer nutrients in litter that are
18 identified on the left-hand side of this exhibit, does --
19 excuse me, can poultry litter use improve the soil by virtue of
20 these conditioning properties listed on the right-hand side of
21 the exhibit?

22 A. Yes, they can.

23 Q. Is it necessary for poultry litter to be tilled into the
24 soil in order for the soil to receive these beneficial changes
25 from litter?

1 A. No, it's not.

2 Q. Dr. Coale, are you familiar with grazing and haying
3 pasture systems such as those that are present in the Illinois
4 River Watershed?

5 A. Yes.

6 Q. What are the primary crops in this type of system?

7 A. Bermuda grass, tall fescue.

8 Q. Is the land application of poultry litter beneficial to
9 these pasture systems?

10 A. Yes, it is.

11 Q. Why?

12 A. Well, the primary benefit derived from poultry litter
13 application and what benefits the farmer in operating the
14 system is the nitrogen supplying capacity of the poultry
15 litter. Supplying nitrogen to the crop, which is probably the
16 element in most high demand by the crop, can be achieved from
17 poultry litter being applied to the pasture.

18 Q. In his opening statement, Mr. Ryan acknowledged that some
19 of the poultry operators have had poultry litter applied to
20 their pastures that are in excess of 65 STP. Dr. Coale, even
21 if the soil is at 65 soil test phosphorus, can poultry litter
22 still provide a benefit to the soil and the forage?

23 A. I assume we're talking about 65 STP as from the Oklahoma
24 full testing laboratory?

25 Q. Yes, OSU standard 65 STP.

1 A. Okay. I just want to make sure we've got the same number,
2 okay.

3 Q. So even if the soil is at OSU 65 STP, can poultry litter
4 still provide a benefit to the soil and the forage?

5 A. Yes, it can.

6 Q. Is there a point at which the application of poultry
7 litter will actually do harm to the soil or harm to the forage?

8 A. Under application rates commonly used, not that I'm aware
9 of.

10 Q. Now, plaintiffs have offered the proposition in this
11 hearing that land applying poultry litter on soils of 65 STP or
12 higher is not agricultural use, but is mere waste disposal.

13 Dr. Coale, does 65 STP define the line between agricultural use
14 of poultry litter and waste disposal?

15 A. I do not believe it does because it's only focusing on one
16 very small component, that would be the phosphorus component of
17 litter.

18 Q. Has the USDA Natural Resources Conservation Service
19 developed criteria for nutrient management?

20 A. Yes, they have.

21 Q. Is that what we call the Code 590?

22 A. Yes.

23 Q. Can you identify what the objectives are for the Code 590?

24 A. The Code 590 is designed to provide guidance for
25 application of nutrients to agricultural land, to assure that

1 many, many different substrains.

2 Q. Now, Dr. Myoda, where were you employed prior to IEH?

3 A. The State of Delaware.

4 Q. What were your responsibilities in the State of Delaware?

5 A. Well, I worked for the Department of Natural Resources,
6 Environmental Control. I worked for the secretary of our
7 department as well as the division of water resource director,
8 Director Donnelly, anything really that had to do with
9 bacteria, the TMDLs for bacteria, the pollution control
10 strategies. I was involved in evaluating the CAFO permits, the
11 MPDS permits, modeling the water rates for the bacteria,
12 authoring the water quality standards, the revised version of
13 the bacteria water quality standards.

14 Q. Were you in charge of the department's molecular lab?

15 A. I was. And at the time of my employment with Delaware, we
16 did not have a molecular lab. That was my first task was to
17 establish the molecular lab with the primary goal of source
18 tracking for the State of Delaware.

19 Q. What was your title?

20 A. I was an environmental engineer.

21 Q. Are you a member of any professional organizations that
22 might be relevant to this case?

23 A. I suppose the American Society of Microbiology and Water
24 Environmental Federation.

25 Q. Are you on any expert panels, committees, work groups?

1 A. I've served on many AFO, CAFO work groups, the expert
2 panel on the new water quality standards in the Airlie Center
3 last spring. I was invited to participate there. A lot of the
4 source tracking studies, the SCCWRP source tracking method
5 comparison study that was referred to earlier here, my lab
6 participated in that.

7 Q. Dr. Myoda, on the expert work group you just mentioned,
8 was that an EPA work group?

9 A. It was.

10 Q. Your name has come up here. It's been highlighted and
11 shown to the Court. Is that the work group that is addressing
12 whether fecal indicator bacteria are a good indicator?

13 A. That is the group, yes.

14 Q. Have you performed fate and transport studies in addition
15 to the microbial work you just mentioned?

16 A. Absolutely, many.

17 Q. And in what context?

18 A. In the State of Delaware, we did a three-year project to
19 take a look at actually the effectiveness of BMPs. This was
20 particularly a cattle field that we funded the fencing to keep
21 the cattle out of the streams. So we took a look at the fate
22 of the bacteria from the cattle into the waterways over a
23 three-year period. We also did fate and transport, more focus
24 on the fate issue of the indicators in marine waters, in
25 freshwater, in ponds versus free flowing streams. We actually

1 Q. All right, please. Dr. Myoda, I think I can cut to the
2 chase on these fecal indicator bacteria. There's been a lot of
3 discussion about them. Is the EPA's work on this settled or
4 ongoing?

5 A. Oh, it's ongoing.

6 Q. Have more recent studies supported the idea that there is
7 a correlation between indicator bacteria and human health in
8 areas that are impacted by animal feces?

9 MR. PAGE: Objection, leading, Your Honor.

10 THE COURT: Rephrase, please.

11 Q. (By Mr. Jorgensen) Dr. Myoda, is there -- in your
12 experience in the more recent studies, what do the more recent
13 studies show about correlation or lack of correlation between
14 animal feces and risk to human health?

15 A. I think it's not just animal feces, the risk and the
16 correlation is in question. I think Timothy Wade of the EPA
17 had a metadata analysis that showed that there really was not
18 correlation in the cumulative work that has been done. But
19 more specifically, Jack Colford did an article and
20 assessment -- epidemiological assessment versus indicators in
21 Mission Bay and found that there was no relation between the
22 indicator concentration and risk.

23 Q. Is that true with human feces as well or just animal?

24 A. It actually works quite a bit better when human feces are
25 involved.

1 Q. Okay. Let's bring up that study you mentioned. It's
2 Defense Exhibit 296. You have it there in front of you. This
3 is a study by Professors Colford and Griffith?

4 A. Yes, yes, I have it here.

5 Q. Can I ask you to turn to page 33? And I believe you've
6 already described what the study was about, so maybe I can just
7 go to the conclusions. On page 33, we've got it up here on the
8 screen. Let me highlight a section at the bottom right-hand
9 corner and blow it up for you. All right, it's on your screen,
10 Doctor, or you can read it on your paper version if you prefer.
11 It will lap over onto the next page.

12 A. "Although levels of contamination and rates of illness
13 were comparable with previous studies, we found no relationship
14 between fecal indicator bacteria and illness rates."

15 Q. And then can you go on and read another quote that we've
16 highlighted here from their conclusion?

17 A. Certainly. "Our findings do not agree with earlier
18 studies reporting associations between bacterial indicators of
19 water quality and illness. We believe these results are due to
20 a lack of human sources of traditional fecal indicator
21 bacteria."

22 Q. From a scientific point of view, Doctor, what implication
23 does this study have for the State's claim of a link between
24 poultry litter and risk to human health?

25 A. Well, that's huge. I mean, you need to show the link

1 between the fecal material from the chickens, the poultry, to
2 any pathogens that may be present at initial deposition and
3 then the way that they could potentially make it into the
4 water. You need to show, one, the correlation there and the
5 fate and the transport all the way through into the water. And
6 that there's no correlation really negates the value of the
7 indicator approach to assess this particular situation.

8 Q. Okay. Let's break that down, if we can. I want you to
9 assume for a moment, if you would, that fecal indicator
10 bacteria are a good source of indication of human health risk.
11 What would you need to know then to know whether there's a link
12 between poultry litter in this case and human health risk in
13 the surface and groundwater?

14 A. Well, I'm sorry, could you repeat the question?

15 Q. Yeah, let me restate. I believe the State has claimed in
16 this case that there is a link, a causal link between poultry
17 litter in poultry houses and bacteria that they find in surface
18 water and groundwater. Now, laying aside for a moment the
19 question of whether those bacteria really do prove a human
20 health risk, what would you need to know to know whether there
21 is a link between the surface water and groundwater bacteria
22 and the poultry house?

23 A. Well, you would need in the feces to show that the
24 pathogens are present. You need --

25 Q. Let me stop you there. Why would you need to know that

1 there are pathogens present in the feces?

2 A. Well, that's -- the assumption here is that the pathogens
3 are from the poultry.

4 Q. I know it's simple, but I just want to bring it out. So
5 keep going.

6 A. So you would need to show that not only the indicators,
7 but the pathogens are present. Their distribution is
8 comparable, meaning that they correlate. You would also have
9 to show then all the different steps. When I say steps, in the
10 step of going from the feces to the litter and the litter in
11 the houses and then the composting occurs in the houses. You
12 would have to look at the fate of each in the houses, then on
13 the fields, then later on in the water. So you'd have to look
14 at the different die-off rates all the way through the process
15 to make sure, you know, if at all, that the pathogens are
16 traveling with the indicators.

17 Q. Why would die-off rates and traveling or not traveling
18 together be important?

19 A. Well, the -- you have to be correlated at each step to
20 reach the conclusion that indicators from this source really do
21 represent some degree of risk in the end, in the surface water
22 here.

23 Q. What would happen if the fecal indicator bacteria are more
24 easily moved or more long lived than any pathogens that might
25 be present?

1 A. It would over -- it would over represent any risk
2 associated there. You could have the indicators come through
3 and the pathogens die before they even get to the water, but
4 some of the indicators still make it.

5 Q. Now, while you're talking about that fate and transport,
6 do all bacteria respond to environmental conditions the same?

7 A. Not at all, not at all. Great deal of difference.

8 Q. Can you explain some of the conditions that might cause
9 different responses?

10 A. The growth rate, the factors are numerous. Could be pH,
11 sunlight, exposure to oxygen, temperature, nutrient
12 requirements. There are a plethora of factors that affect
13 survival.

14 Q. Let me follow the pathway that you laid out, Doctor. Let
15 me start -- I believe you mentioned in the feces. Have you
16 reviewed the State's testing for actual pathogens in the
17 Illinois River Watershed?

18 A. I have.

19 Q. What did you discover from that review?

20 A. They found virtually no pathogens.

21 Q. Now, have you heard here in court the State's experts
22 explain that they couldn't find actual pathogens because those
23 pathogens might be -- I think the phrase was viable but
24 non-culturable?

25 A. I have.

1 however the State has not done that in my mind. I have not
2 seen any evidence that they have conclusively shown that at
3 all.

4 Q. What would they need to show you?

5 A. They would need to show -- quite frankly, you would be
6 able to show sources. But I don't think a chicken is so
7 different in Arkansas than one in Oklahoma that you could say
8 this is an Arkansas bacteria or this is an Oklahoma. You just
9 can't get to that level.

10 Q. What are some of the fate and transport parameters that
11 would affect whether a bacteria could make it from over here in
12 Arkansas over into Oklahoma?

13 A. Well, the list I mentioned before, I mean, you've got the
14 sunlight, UV is going to kill them. Predation, the protozoa
15 love to eat the bacteria. They are going to settle out. You
16 get some lower flows, they'll go down into the sediment. The
17 die off. I mean, these bacteria, the indicator, you have to
18 remember they're used to being inside your gut in 37 degree
19 body temperature with, you know, all the nutrients and
20 everything in your gut and they're being deposited out in the
21 environment. It's not the best environment for them.

22 Q. Are different types of bacteria different in the way they
23 move?

24 A. Absolutely.

25 Q. Have you heard the concept of stickiness referred to here

1 in the court?

2 A. Yes.

3 Q. It's probably not a professional term, so let me ask you
4 to describe what stickiness means.

5 A. Well, stickiness, when I think of stickiness, I think of
6 adsorption, when a particle is going to associate with and --
7 well, two phenomenon of particles sticking together, adhesion
8 and absorption. And I always think of adhesion like adhesive
9 tape, like Scotch tape. And adhesion to me is it sticks on,
10 it's electrostatic or some other course make it stick.
11 Adsorption I think of as actually like a Charmin paper towel
12 that goes into the soil or goes into the matrix and becomes
13 intertwined. So those two things happen a lot in the sediment.
14 You know, bacteria are like particles, they'll settle out and
15 they'll be in the sediment. And that brings up another great
16 point.

17 The sediment becomes a secondary source of the
18 indicators, so that's a reservoir of the indicator bacteria
19 that have really no association with pathogens at all. So in
20 the high flow, when you are going to get runoff and when you're
21 going to rain, they get scoured up and they get resuspended so
22 the indicator concentration goes up. Those aren't bacteria
23 that have originated from feces, at least they have only
24 secondarily originated from feces. They're no longer
25 associated with pathogens.

1 Q. Does that have any effect on the supposed link between the
2 presence of those indicator bacteria and pathogens?

3 A. It absolutely does. It confounds the relationship even
4 further. As a matter of fact, in the guidance, the EPA
5 guidance, implementation of bacterial water quality standards,
6 there is a section devoted to high flow. Some states have
7 exemptions. And right now the argument is how to quantify
8 where high flow occurs, how much is being resuspended. You
9 know, it's an area that's really getting a lot of work right
10 now, a lot of attention.

11 Q. Thus far, Dr. Myoda, we've been discussing the idea of
12 whether it's scientifically plausible that bacteria would move
13 from Arkansas over to Oklahoma. Would all those same factors
14 apply in Oklahoma, to the bacteria moving in Oklahoma?

15 A. Yeah, they don't know what state they're in, yes.

16 Q. Doctor, is it important to understand in a specific
17 watershed how various species of bacteria move and live and
18 die?

19 A. Well, it's important to know your study area. These
20 transport phenomenon are site specific. A lot of factors
21 influence things, you really have to take a look in your
22 watershed when you're doing a study like this.

23 Q. All right. Doctor, I think I can wrap up this point.
24 Have you seen any evidence that the State studied these many
25 fate and transport characteristics in the Illinois River

1 Watershed?

2 A. No, I have not.

3 Q. Did you hear the testimony of Valerie Harwood here in
4 court?

5 A. I did.

6 Q. Did you attend her deposition?

7 A. I did.

8 Q. Have you reviewed her work?

9 A. I have.

10 Q. Did you hear her testify that she did not do a fate and
11 transport study?

12 A. She did say that, yes, I believe.

13 Q. Did you hear the testimony of Dr. Olsen?

14 A. I also heard Dr. Olsen.

15 Q. Did you hear him say that he did not do a fate and
16 transport study?

17 MR. PAGE: Objection, that mischaracterizes the
18 testimony of Dr. Olsen.

19 THE COURT: Sustained.

20 Q. (By Mr. Jorgensen) What, if anything, did you hear
21 Dr. Olsen say about whether he did a fate and transport study?

22 A. I believe he said something to the same effect, that he
23 did not.

24 Q. Did you hear Dr. Teaf testify?

25 A. I did.

1 A. I'm sorry, mine aren't marked like 95, that kind of thing.

2 Q. Well, I'm going to come give you a set that are. That
3 will make it go faster.

4 A. Oh, yes, yes, yes.

5 Q. Doctor, what is Defense Exhibit 95?

6 A. It's an article on indicators and pathogenic bacteria and
7 how well they survive in cattle feces.

8 Q. What did the study determine about the bacterial content
9 of cow pies?

10 A. Cow pies are a great refuge for the indicator bacteria and
11 the pathogens. That cow pie, you know, when it comes out, and
12 pardon me, but you know it's just steaming pile. It's hot,
13 it's got a high moisture content, it's nutrient rich. And then
14 what happens is it dries out on the outside a little bit. So
15 it's like an egg, it's got a shell around it that protects that
16 internal portion of the pattie. So it traps in the moisture
17 and nutrients so the bacteria, they're really happy. So in
18 this, they show within a week or so, an order of magnitude of
19 growth not only for the indicator bacteria, but for some of the
20 other bacteria they had some growth. And some didn't do so
21 well, some of the bacteria died rather quickly. But I think it
22 was about 16 X increase in the pattie within a week, three days
23 or so, if I recall correctly.

24 Q. So just to be clear, when poultry feces comes out of the
25 bird into the dry environment, what is the process that begins?

1 A. Well, it starts to dry out and it's desiccated. So
2 completely different -- one is drying out, one is dying. One
3 is on the surface exposed to UV. When in the cow pattie, now
4 you've got this great, great environment for bacteria to grow.
5 And it's protected, too, so it's like a little egg just waiting
6 to break open.

7 Q. I grew up on a cattle ranch, so I know what you're talking
8 about. Let's go to Defendants' Exhibit 98.

9 A. We had about 300 cattle ourselves.

10 Q. All right. Do you have the number copied there,
11 Defendants' Exhibit 98?

12 A. Yep, I have it.

13 Q. This is entitled Transportation of Fecal Bacteria From
14 Poultry Litter and Cattle Manures Applied to Pastureland. What
15 did this study conclude regarding whether cow patties shed
16 those bacteria that you've just mentioned?

17 A. They do. A couple of things, this paper showed that the
18 bacteria, the runoff from cows were an order of magnitude
19 higher than turkeys. It also showed that when that pattie was
20 broken up, either by like physical, like a cow walking on the
21 pattie and breaking it up and opening it open or just the rain
22 breaking that pattie open, the bacteria would be free to
23 disburse into the environment and run off into the surface
24 water.

25 Q. Okay. While we're talking about cattle, let's bring up

1 Demonstrative Exhibit 40. Doctor, did you prepare this
2 exhibit, Demonstrative Exhibit 40? Hang on, it will take just
3 a second for it to come up on the screen.

4 A. Oh, I did, yes.

5 Q. Can you explain what we should draw from it, what you want
6 to point the Court to there?

7 A. Well, when you take a look at this, one cow, you know, 15
8 to 30 kilogram of feces a day, but there's a couple hundred
9 thousand cows there. If you take a look at the E. coli content
10 in the manure, you've got about three million CFUs, colony
11 forming units, per gram when they are growing -- or I'm sorry,
12 when they're depositing. After a few days, three days to a
13 week, they're grown up in that cow pattie, you're going to get
14 about 48 million E. coli in each gram of cattle feces. And
15 when you look at in a day, you just have -- I mean, you have
16 192 quadrillion bacteria per day.

17 Q. So, Doctor, referring back to Exhibit 95, Professor
18 Sinton, et al, did they count up the number of E. coli in a
19 gram of cow manure?

20 A. I'm not sure it was in that article.

21 Q. I hope I'm referring to the right one. Exhibit 95,
22 Sinton, et al, survivor of indicator and pathogenic bacteria in
23 bovine feces on pasture.

24 A. I think it was that --

25 Q. Is that where you drew your three million CFU per gram?

1 A. I need to find that and take a look at that.

2 Q. Okay. Go ahead.

3 A. I'm not sure if this was in this article or another.

4 Q. Okay. Well, what are -- based on your review of the
5 literature, what is the initial number per gram of E. coli in
6 cattle manure?

7 A. Well, initially it's three million.

8 Q. Per gram?

9 A. Per gram.

10 Q. And then in cattle manure, does it grow based on those
11 factors you talked about, the unique characteristics of a cow
12 pie, or does it die?

13 A. I just testified it grows 16 times.

14 Q. Over the course of?

15 A. Three days to a week.

16 Q. Now, after that, will eventually the cow pie dry out and
17 the bacteria die off?

18 A. Oh, with time, but you'll find for months and months that
19 it will persist out there in the environment in the pattie.

20 Q. Doctor, based on 200,000 cows in the Illinois River
21 Watershed producing 192 quadrillion CFUs of E. coli every day,
22 do you find it scientifically remarkable that the State found
23 these kind of numbers at the edge of cattle fields?

24 A. I would expect them to find numbers like that.

25 Q. In all of the evidence that you've heard in this case and

1 reviewed, Doctor, have you seen anything that can show that
2 these numbers, these bacteria found at the edge of cattle
3 fields came from poultry litter applied on those cattle fields
4 and not cattle on those cattle fields?

5 A. No, there's absolutely no indication of the source of
6 those whatsoever.

7 Q. I have to go through my cow pie notes for just a second.
8 Let's turn, Doctor, from the edge of the field then, to surface
9 water and groundwater. You have talked about the EPA water
10 quality standards and fecal indicator bacteria. Let's talk
11 about what the State found in surface water and groundwater.
12 What pathogens was the State able to find?

13 A. I don't believe, in the surface water or the groundwater,
14 that there may have been one or two samples of Salmonella, but
15 I don't believe they found any pathogens.

16 Q. Now, if we were to assume that there were a link, that the
17 link had gotten this far, that the bacteria had not died on the
18 poultry house floor, they had not died when being spread as a
19 dust, that these numbers on State's Exhibit 405 were poultry
20 litter bacteria and not cattle bacteria, assume all that had
21 been shown, where would these bacteria need to go next in order
22 to make it to surface water and groundwater?

23 A. Well, it's hard to make that assumption, but if I did, the
24 next transition would be then from the fields to -- well, to
25 the surface water. There would have to be some mechanism. The

1 bacteria are nonmotile, there would have to be a large rain
2 storm to move them.

3 Q. Has the State studied, to your knowledge, the amount of
4 rain it would take to move the bacteria?

5 A. Not that I'm aware of, no, sir.

6 Q. Do different types of soil in the field have different
7 effects on the different types of bacteria?

8 A. Absolutely.

9 Q. Does vegetation filter bacteria?

10 A. Oh, it certainly does. Riparian buffers are an excellent
11 best management practice tool to put in place to prevent
12 bacteria from entering the water.

13 Q. Okay. Now, we've talked at the edge of these fields about
14 cattle and about poultry litter. Are there any other possible
15 sources of indicator bacteria or pathogens in the IRW?

16 A. Well, sure, these indicators are associated with any
17 warm-blooded mammal. There are birds, rodents. You'll get
18 deer, you'll get skunks, you get opossums, you get --

19 Q. Let's bring up State's Exhibit 221. Hang on, it will come
20 on the screen in just a second, Doctor. This is the affidavit
21 of Dr. Billy Clay. Are you familiar with this, Doctor?

22 A. I looked over it, yes.

23 Q. Are you familiar with the list of animals listed in this
24 exhibit, Doctor? Let's go to, in the exhibit, page -- it will
25 take me just a second to come up with it. Let's put up this

1 list for now. And in the meantime, let's be looking for the
2 other list. Yes, thank you so much. Are you familiar with
3 this list, Doctor?

4 A. I am.

5 Q. Would each of these animals be a potential contributor?

6 A. Absolutely, yes.

7 Q. Let me focus on some of the smaller animals that you've
8 mentioned. You've mentioned deer, you've mentioned sheep, I
9 believe you mentioned geese and ducks. Now, could those really
10 be a significant source of either pathogens or indicator
11 bacteria in surface water? I mean, there are so many fewer
12 than other types of animals?

13 A. I'd agree they're so much fewer when you take a look at
14 the amount of manure generated. But it is, in my opinion, a
15 huge mistake to discount those sources. Proximity trumps
16 quantity when it's further away. The fate and the transport is
17 such a key issue here. You know, the proximity really is the
18 key. And time and time again in our source tracking work in
19 our studies, we have found dominant sources to be -- when I say
20 dominant, 20, 25 percent, avian, small mammal, rodents. You
21 know, those sources that are defecating at or in the stream,
22 they play such a huge role because they're not subjected to all
23 the, potentially, kill steps along the way into making it into
24 the waterway. So those are absolutely huge. But even when you
25 take a look at the major contributors, I mean, you'll see that

1 in terms of cattle versus the poultry, there's seven times more
2 fecal matter generated by the cows than the poultry.

3 Q. Now, Doctor, on that point that there's more fecal matter
4 generated by cattle, I believe we had some discussion
5 yesterday, though, that the cattle manure is wet and whether
6 that makes a difference. Does it make a difference in how
7 microbes like bacteria live, prosper or die if the cattle
8 manure is wet?

9 A. Well, not only it's wet, it's protected. It's in a nice
10 pattie. So they're growing really well, so they're
11 multiplying.

12 Q. All right. The fact then that the cattle manure is stated
13 in wet tons, does that make it a better home for bacteria, more
14 of a risk for bacteria or less of a risk for bacteria?

15 A. I don't think the way you state it in wet tons or dry tons
16 really affects how the bacteria grow. You know, the label is
17 irrelevant. What I think is important is that because the
18 manure is wet, it's going to be growing.

19 Q. All right. While we're talking about --

20 A. And you know, when the poultry is dry, it's not.

21 Q. While we're talking about wet versus dry, did you hear
22 Mr. Lennington talk with Dr. Jaffe about the word CAFO?

23 A. I did.

24 Q. Do you have experience with CAFO's?

25 A. I do.

1 Q. What is a CAFO?

2 A. Combined animal feeding -- concentrated animal feeding
3 operation.

4 Q. Is that a regulatory term?

5 A. Oh, it is, it is. We have to include the CAFO and CAFO
6 load allocations, discharge allocations in our TMDLs as part of
7 the waste load allocation process.

8 Q. I believe Mr. Lennington asked Dr. Jaffe about CAFO's
9 where the herd would contribute feces that would then be a home
10 for bacteria. Did you hear that same thing?

11 A. I did.

12 Q. Have you ever heard poultry referred to as a herd?

13 A. No, poultry is a flock. It was clear to me that reference
14 was to cattle. And I believe that with maybe one exception,
15 there are no poultry CAFO's in the IRW.

16 Q. Doctor, let me turn you now to Defense Exhibit 57. I
17 believe you were talking about direct deposit, were you not,
18 and the importance of direct deposit just a moment ago? Just
19 to pick up our train, Doctor, what is the importance of direct
20 deposit, if any, to a fate and transport study?

21 A. Well, direct deposit, they're there, they're in the water,
22 they're immediately innumerable. You're going to count them
23 from the time of deposition. They don't die on their way in.
24 They're not subjected to the UV. They're not subjected to the
25 desiccation. They're not -- there's no time in the transport

1 to get eaten by the protozoa and the predation.

2 Q. Dr. Myoda, of the animals listed here on Defendants'
3 Exhibit 221, which of them directly deposit into surface water?

4 A. Well, the cattle, especially in the summer when it's hot,
5 they like to be in the water just like we like to recreate in
6 the water. So they'll cool off, they'll drink. A lot of the
7 others, the deer and wildlife, they'll go down to the waterways
8 and drink. I guess I'm recalling Dr. Harwood's testimony, you
9 know, the geese and the ducks defecate in the water as well.

10 Q. Doctor, we have to go to what is my favorite study in this
11 whole case because it reminds me of my youth. Let me refer you
12 to Defense Exhibit 57 by Professors Davies and Colley, Water
13 Quality Impact of a Dairy Cow Herd Crossing a Stream. What did
14 Drs. Davies and Colley or, perhaps it's one and I'm saying it
15 twice, but what was studied in this study? What was the topic?

16 A. Well, dairy cows and when they walked across the stream
17 and when they were in the stream, what effect it had on water
18 quality.

19 Q. And did the authors discover anything about cattle
20 preferences for where they use the bathroom?

21 A. They were 50 times more likely to do it in the stream.

22 Q. Thank you. All right. Doctor, let me turn to the State's
23 microbial source tracking approach here. Have you reviewed the
24 State's use of microbial source tracking in this case?

25 A. I have.

1 A. Okay. They're in the pile. Just one moment.

2 Q. The first one I want to ask you about is Defendants'
3 Exhibit 296.

4 A. Could you --

5 Q. It's the one for Mission Bay, California.

6 A. Oh, Jack Colford's.

7 Q. Yeah. Where is Mission Bay, California?

8 A. Mission Bay. You know, I'm not exactly sure.

9 Q. Is it -- would you know that it's in San Diego,
10 California?

11 A. Oh, I wouldn't know. I don't know where it is.

12 Q. Okay. And this study that you rely on for showing that
13 fecal coliforms would not be a hazard from poultry actually
14 looked at marine waters and not fresh waters; correct?

15 A. Uh-huh.

16 Q. Mission Bay -- you relied on it?

17 A. Uh-huh.

18 Q. Okay. And do you know how many poultry houses there are
19 in San Diego?

20 A. Well, quite frankly, I wouldn't think there was a lot of
21 poultry houses.

22 Q. This was an urban runoff study, correct, an urban runoff
23 study?

24 A. Yes.

25 Q. So what relevance does it have to evaluation of hazard in

1 a freshwater rural environment with poultry?

2 A. Well, the relevance is that it shows that the indicator
3 approach is not appropriate in all situations.

4 Q. But it would make a difference if you had the same type of
5 sources, whether poultry versus dog and cat; correct?

6 A. Exactly, I mean, and that's the point. It makes a huge
7 difference what the sources are and where and it's site
8 specific and the standards shouldn't be universal.

9 Q. And this doesn't have any poultry in it, does it, this
10 study?

11 A. I don't believe that -- well --

12 THE COURT: First sentence.

13 A. No.

14 Q. (By Mr. Page) Okay. Thank you, sir. Now, let's look at
15 Defendants' Exhibit 96.

16 A. Okay. I'm sorry. Mine aren't numbered.

17 Q. Yeah, this one is by Mr. Lu.

18 A. Okay, yeah.

19 Q. Evaluation of broiler litter with reference to microbial
20 composition.

21 A. Got it, yeah.

22 Q. Now, this particular study, was that based on a
23 library-based study or a PCR-based specific molecular study
24 done by Dr. Harwood?

25 A. Well, this study was taking a look at the presence or

1 IN THE UNITED STATES DISTRICT COURT
 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,)
 4 W.A. DREW EDMONDSON, in his)
 capacity as ATTORNEY GENERAL)
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 et al.)
 6)
 Plaintiffs,)
 7)
 V.) No. 05-CV-329-GKF-SAJ
 8)
)
 9 TYSON FOODS, INC., et al.,)
)
 10 Defendants.)

11
 12
 13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 MARCH 11, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME VIII

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

19
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17 PROCEEDINGS

18 March 11, 2008

19 THE COURT: Be seated please. My staff is obviously
 20 having fun with me. The defendants may call their first
 21 witness.

22 MR. GEORGE: Your Honor, before we call our witnesses,
 23 could I address the Court for just a moment --

24 THE COURT: Yes, sir.

25 MR. GEORGE: -- with regard to scheduling? I wanted

1 A. No, sir. I never hear anything.

2 MR. NANCE: Nothing further, Your Honor.

3 THE COURT: May this witness be excused?

4 MR. ELROD: I have nothing.

5 MR. NANCE: Nothing from us, sir.

6 THE COURT: Thank you. The defendants may call their
7 next witness.

8 MR. MCDANIEL: Your Honor, if it please the Court, Ms.
9 Longwell and Mr. Mirkes will read into the record some
10 deposition excerpts of some growers that have been deposed in
11 the action. And that's a total of about 20, 25 minutes?

12 MS. LONGWELL: It's closer to 30 but...

13 THE COURT: We will break it up.

14 MS. LONGWELL: Your Honor, Mr. Mirkes will be reading
15 the part, the answers that were given by the growers Joel Reed,
16 Jim Lance Pigeon, Steve Butler, Larry McGarry, W.A. Saunders
17 and Juana Loftin.

18 Deposition of Joel Reed on June 11th, 2007.

19 Q. "Let me ask you this way then. Did you negotiate any of
20 the terms that are written on your poultry growing operation
21 contract?

22 A. "No.

23 Q. "Was there ever a time when you really didn't want to be
24 responsible for the waste generated by the birds?

25 "MR. HIXON: Object to form.

1 A. "Well, I call it chicken litter or fertilizer. And no,
2 I've always wanted it.

3 Q. "Do each of the integrators own the birds that you care
4 for?

5 A. "Yes.

6 Q. "Who owns the dead birds when that occurs?

7 A. "I guess I do.

8 Q. "All right. Is it your responsibility to dispose of the
9 carcasses that result in the growing?

10 A. "Yes.

11 Q. "Do either of these integrators pick up the carcasses from
12 you?

13 A. "No.

14 Q. "What do you do with the carcasses?

15 A. "I incinerate them and compost.

16 Q. "Who determines when the birds are to be picked up from
17 your location after growing?

18 A. "I guess the integrator would."

19 MS. LONGWELL: Page 50 line 2.

20 Q. "So when they're delivered to you, you've not have any had
21 any choice in this kind of bird comes to you; is that correct?

22 A. "That's correct.

23 Q. "Who supplies all the feed to your farm for the birds?

24 A. "The integrator does.

25 Q. "Both of them?

1 A. "Yes.

2 Q. "Who delivers the feed to your farm?

3 A. "Simmons and George's.

4 Q. "Who supplies medication for the birds when in your care?

5 A. "The integrators.

6 Q. "Who supplies who supplies any vaccinations required for
7 the birds?

8 A. "The integrators.

9 Q. "Do you pay for any of the medication or vaccinations that
10 are administered to the birds?

11 A. "No.

12 Q. "Who supplies any veterinary services that you may require
13 for the birds?

14 A. "The integrators do.

15 Q. "Do each of the integrators supply you with a field
16 service rep or a service tech person?

17 A. Yes."

18 MS. LONGWELL: Page 59, line 11.

19 Q. "Compared to the time that you grew for George's and now
20 for Simmons, is there any real significant difference in the
21 way they operate as it pertains to your operation?

22 A. No."

23 MS. LONGWELL: Page 103, line 19.

24 Q. "What instructions or recommendation, if any, have you
25 ever received from Simmons or its representatives regarding the

1 spreading of poultry waste?

2 A. "None.

3 Q. "I'll ask you the same question as it relates to George's.
4 Have they given you any instructions or recommendations with
5 regard to spreading poultry waste?

6 A. "No. Just follow the regulations, rules and regulations."

7 MS. LONGWELL: The deposition Jim Lance Pigeon, dated
8 May 25th, 2007.

9 THE COURT: Will there be any counterdesignations with
10 respect to any of these?

11 MS. LONGWELL: They are included in, Your Honor.

12 MR. BULLOCK: Yes, Your Honor, we have already made
13 counterdesignations and they are reading those.

14 THE COURT: Okay. Good, thank you.

15 MR. HAMMONS: I'd also, I would like to point out,
16 Your Honor. Did you read 26, 16 through 19. I believe there's
17 one that you missed.

18 MS. LONGWELL: Which ones?

19 MR. HAMMONS: It's the counterdesignation for Joel
20 Reed. Excuse me. Disregard.

21 MS. LONGWELL: Okay.

22 THE CLERK: Did you say Higgins?

23 MS. LONGWELL: Pigeon. Jim Lance Pigeon.

24 Your Honor, page 46, line 8.

25 Q. "Does poultry waste produced from your barns ever go off

1 your property?

2 A. "Go off?

3 Q. "Does it leave your property?

4 A. "Yes, it does.

5 Q. "And when it does is it because you have sold it or given
6 it away; which?

7 A. "It's because I've sold it."

8 MS. LONGWELL: Page 52, line 1.

9 Q. "Generally speaking who has the day-to-day operation or
10 control of would your facility?

11 "MR. BOND: Object to form.

12 A. "Myself.

13 Q. "And has that changed at any time during the time you
14 started until the time of today?

15 A. "No, it has not."

16 MS. LONGWELL: Page 54, line 10.

17 Q. "Do the birds that Tyson delivers, are they owned by you
18 or Tyson?

19 "MR. WILLIAMS: Object to form.

20 A. "I believe the birds are owned by the integrator."

21 THE COURT: For the record the two proceeding
22 objections are overruled.

23 MS. LONGWELL: Do you want me to pause, Your Honor, as
24 we go through these when I hit an objection?

25 THE COURT: Well, to the extent that the objection is

1 THE COURT: "Any of your growing operation records."
2 Overruled.

3 A. "In my opinion I don't feel that they have the right to
4 inspect those records as long as I'm following what's required
5 of the law."

6 MS. LONGWELL: Page 174, line 15.

7 Q. "Let me try to clarify that. You own the poultry barns
8 that are on that farm?

9 A. "Yes.

10 Q. "You own the equipment that you use on that farm?

11 A. "Yes.

12 Q. "And is there a house on that farm?

13 A. "Yes.

14 Q. "Do you own that house?

15 A. "Yes."

16 MS. LONGWELL: Page 175 line 13.

17 Q. "Okay. I'm assuming that you generate an electricity bill
18 from poultry operation?

19 A. "Yes.

20 Q. "Who pays that electricity bill?

21 A. "I do.

22 Q. "And I think you testified before that you don't have any
23 employees that work on your farm?

24 A. "That's correct.

25 Q. "Okay. Have you ever had any employees work on your farm?

1 A. "I have had on very few occasions.

2 Q. "Okay. And on those occasions did you hire that person to
3 work on your farm?

4 A. "Yes.

5 Q. "Okay. So did you pay that person?

6 A. "Yes, I did.

7 Q. "Does Tyson offer you any benefits like health care and a
8 profit sharing plan, all that kind of stuff?

9 A. "No.

10 Q. "Do they have withhold any FICA or social security from
11 the check you get when your flock is sold?

12 A. "No.

13 Q. "You don't get paid by the hour do you?

14 A. "No.

15 Q. "From Tyson? Let me clarify that.

16 A. "No.

17 Q. "You're not paid a salary from Tyson, are you?

18 A. "No."

19 MS. LONGWELL: Page 178, line 6.

20 Q. "Does Tyson tell you when to cake-out your houses?

21 A. "No, they do not.

22 Q. "Does Tyson tell you when to clean out your houses?

23 A. "No, they do not.

24 Q. "Does Tyson tell you where to land apply poultry litter?

25 A. "No, they do not."

1 MS. LONGWELL: Page 182, line 17. And it's the second
2 sentence.

3 Q. "What I'm asking is when you were contracting with
4 Peterson Farms to grow chickens for Peterson Farms you were
5 ultimately responsible for the production on your farm?

6 A. "Yes.

7 "MR. GARREN: Object to the form as leading."

8 THE COURT: Sustained.

9 Q. "When you were growing for Peterson, did Petersen ever
10 tell you when or how to clean out your house, your houses?

11 A. "No, they did not.

12 Q. "Did they tell you when to apply your litter?

13 A. "No, they did not.

14 Q. "Or where to apply your litter?

15 A. "No.

16 Q. "Did they instruct you to sell your litter?

17 A. "No.

18 Q. "Did they instruct you you could not sell your litter?

19 A. "No."

20 MS. LONGWELL: The deposition of Steve Butler on April
21 26, 2007. Page 78, line 16.

22 Q. "All right. When you took over these complexes, did you
23 in fact sell 100 percent of all the litter or waste that's
24 produced from the barns from the 16 complexes?

25 A. Yes."

1 MS. LONGWELL: Page 82, line 13.

2 Q. "And you put it in there because it absorbs the moisture
3 from the urine and excrement that the birds excrete?

4 A. "That's correct.

5 Q. "So at some point in time it gets mixed together into a
6 combination of bedding material and the waste excreted from the
7 birds; correct?

8 A. "That would be correct."

9 MS. LONGWELL: Page 86, line 20.

10 Q. "All right, so that I'm clear. Have you ever given waste
11 away to somebody who land applied it on any of your land?

12 A. "Green Country Farms does not.

13 Q. "So all of the complexes that you operate at Green Country
14 since you have operated it from February of '04, there has been
15 no land application to any of those properties; is that
16 correct?

17 A. "To the best of my knowledge, no.

18 Q. "I mean land application meaning poultry waste land
19 application, not commercial fertilizer?

20 A. "Right.

21 Q. "You did give one comment about one guy might have used --

22 A. "And I'm not real clear on that. He asked permission. I
23 told him he could use commercial but not litter."

24 MS. LONGWELL: Page 104, line 18.

25 Q. "Did you make any proposals or suggestions to Tyson that

1 you didn't want to be responsible for the waste that's
2 generated by their birds in these complexes?

3 A. "Absolutely not.

4 Q. "Was that a consideration when you entered into this
5 agreement about what to do with the waste, poultry waste?

6 A. "Poultry litter was a consideration.

7 Q. "And what is that consideration?

8 A. "Well, you've got to take into account you don't -- you
9 don't know what the future was for litter. But to me it's a
10 commodity, I can selling it and make money."

11 MS. LONGWELL: Page 114, line 22.

12 Q. "And we see Raymond Tinney's name there as approved buyer,
13 don't we?

14 A. "Yes.

15 Q. "Where does he live or operate?

16 A. "Just outside of Checotah, Oklahoma.

17 Q. "So that's south. And so he's your main customer for the
18 disposition of the poultry waste generated at your complexes;
19 correct?

20 A. "He purchases the majority of our litter and then resells
21 it to his fertilizer -- He is a fertilizer, that's what he does
22 for a living.

23 Q. "Right.

24 A. "So he purchases our litter and then resells it in the
25 area down there."

1 MS. LONGWELL: Page 118, line 23.

2 Q. "Do you consider yourself an independent contractor doing
3 the work for Tyson, is that what --

4 "MR. WILLIAMS: Object to form."

5 THE COURT: Overruled.

6 A. "I'm definitely an independent. I mean I contract, raise
7 broilers for Tyson.

8 Q. "Okay. What, if any, encouragement or -- that's fine,
9 encouragement did you receive from Tyson to participate in the
10 grant projects for litter transport?

11 A. "Encouragement? Define what you mean by encouragement.

12 Q. "We'll, start back a little bit then. You indicated that
13 your first contact on the this was seeing the ads of BMP and
14 you made a phone call?

15 A. "Uh-huh.

16 Q. "Did Tyson or any of its representatives explain to you
17 that that project is out there, that grant money is available
18 and you need to get into it?

19 A. "Shortly after that I did have a conversation with some
20 folks from Tyson that said, yes, it's there and that would be
21 great.

22 Q. "Who was it that you talked to?

23 A. "It would be -- I know Steve Patrick. Steve Patrick is
24 who I talked to about that.

25 Q. "What's his position with Tyson?

1 A. "Yes.

2 Q. "And what was the reason for that?

3 A. "Well, I thought it was very unique when I got there to
4 see that many chicken houses and sage grass and worthless hay
5 growing everywhere and then as I got to doing my due diligence,
6 found out that Hudson never spread, Tyson never spread, and I
7 didn't want to start. I'm talking with Adair County right now,
8 though, about possibly going into a Bermuda deal."

9 MS. LONGWELL: Page 237, line 24.

10 Q. "Do you consider yourself a businessman, sir?

11 A. "I do.

12 Q. "And Green Country Farms is your business; is that right?

13 A. "That is my business.

14 Q. "How many employees does that business support?

15 A. "Approximately 45.

16 Q. "And you are responsible for paying the wages of those
17 employees?

18 A. "Yes, I am.

19 Q. "I assume that business, like many other businesses, has
20 debt associated with it; is that fair?

21 A. "Very much so.

22 Q. "And you and not Tyson are responsible for paying that
23 debt; correct?

24 A. "That's correct."

25 MS. LONGWELL: The deposition of Larry McGarrah, dated

1 Q. "How did you decide to go into the poultry growing
2 business?

3 A. "Source of income. Just decided we needed the income and
4 we needed the fertilizer."

5 MS. LONGWELL: Page 58, line 8.

6 Q. "Well, was it your choice to keep all the poultry waste
7 generated from poultry barn?

8 A. "Yes."

9 MS. LONGWELL: Page 58, line 15.

10 Q. "In your contracts with Tyson have you ever negotiated
11 that you would keep or not keep the waste from your poultry
12 operation?

13 A. "No."

14 Q. "Have they at any time indicated they didn't want to you
15 keep the poultry waste?

16 "MR. BOND: Object to form."

17 THE COURT: Overruled.

18 A. "No."

19 MS. LONGWELL: Page 61 line 4.

20 Q. "All right. SO have you ever attempted to put your litter
21 in that, I'm calling it a broker arrangement, where you can
22 sell it?

23 A. "No."

24 Q. "It's been your intention to use it at all times on your
25 land?

1 A. "Yes."

2 MS. LONGWELL: Page 99, line 23.

3 Q. "Does the type of deal then give you any instructions on
4 how or where to apply poultry waste?

5 A. "No."

6 MS. LONGWELL: Page 100, line 1.

7 Q. "Has he ever in the past discussed with you how or where
8 you should apply poultry waste on your facility?

9 A. "No."

10 MS. LONGWELL: Page 128, line 3.

11 Q. "Do the service techs ever come in prior to a flock going
12 in to see that it's properly prepared and to accept a flock?

13 A. "Yes."

14 Q. "So they do that every time?

15 A. "Yes."

16 Q. "And for every barn?

17 A. "Yes."

18 MS. LONGWELL: Page 152, line 4.

19 Q. "Who supplies the -- who supplies the feed for your
20 poultry birds when you have them?

21 A. "Tyson."

22 MS. LONGWELL: Page 167, line 19:

23 Q. "The cost for soil and waste analysis tests, do you pay
24 for those?

25 A. "Yes."

1 Q. "Are you reimbursed those from the Tyson integrator?

2 A. "No."

3 MS. LONGWELL: Page 196, line 10.

4 Q. "Okay. As I understand it your prior testimony was that
5 you really didn't have any way to negotiate this or it didn't
6 matter or it didn't seem to matter to you whether you tried?

7 MR. WILLIAMS: Object to form."

8 THE COURT: Overruled.

9 A. "I didn't even try."

10 MS. LONGWELL: Page 196, line 23.

11 Q. "The portion that has the duration has two blanks and the
12 date's typed January 1, '05 and the second blank filled in
13 January 1, 2008. Did you negotiate with the company how long
14 you would get in the way of a contract?

15 A. "I talked to the company and went down and I met the
16 requirements and he said I'm eligible for a three-year
17 contract.

18 Q. "He said you were eligible for a three-year contract?

19 A. "My houses would pass the requirements for a three-year
20 contract.

21 Q. "Do you know what changes in your houses would cause you
22 not to be able to be eligible for a three-year contract?

23 "MR. BOND: Object to the form.

24 "MR. WILLIAMS: Object to the form."

25 THE COURT: Overruled.

1 A. "Well, I had to put in a water meter and a power failure
2 alarm.

3 Q. "You had to add that in order to get three-year contract
4 this time?

5 A. "Yes. And my houses had to be tight enough they could
6 pull as much wind speed through them and they had passed.

7 Q. "And who tested your house for that are purpose?

8 A. "The field men.

9 Q. "Okay. And so once these three things were confirmed,
10 that made you eligible then for this three-year contract?

11 A. "Yes."

12 MS. LONGWELL: The deposition W.A. Saunders, volume
13 one, dated October 23rd, 2006. Page 29, line 3.

14 Q. "What facts or reasons did you have for going into the
15 poultry growing operation business?

16 A. "To try and make any cow operation work better.

17 Q. "And how do you mean by that?

18 A. "By the fertilizer.

19 Q. "And tell me what --

20 A. "Poultry litter. I bought a piece of farmland that was
21 very poor, had been cleared, then left to go back to seed, had
22 never been taken care of. Fertility on it was little to none
23 and I was either going to have to put a tremendous amount of
24 commercial litter on it, commercial fertilizer or poultry
25 litter. With the number of acres I had, I could not afford the

1 commercial. Plus, I was working out and trying to support a
2 cow farm, and the chicken farm gave me a chance to stay at home
3 and make a living and improve my cow farm?

4 Q. "So you bought it in order to have the waste from the
5 poultry farm?

6 A. "As well as income from poultry farm, sure."

7 MS. LONGWELL: Page 43, line 8.

8 Q. "Who is considered to be in charge of the day-to-day
9 operation of the poultry growing portion of your business?

10 A. "I am."

11 MS. LONGWELL: Page 49, line 4.

12 Q. "All right. We talked earlier about -- I think you
13 referred to him earlier as a field rep or a field supervisor?

14 A. "Field man.

15 Q. "I want to use your term so we know who we're talking
16 about.

17 A. "He's the field man.

18 Q. "And tell me what is it that field man does as it relates
19 to you?

20 A. "He'll come in, check the feed bins for quantity. He'll
21 check around the house to make sure good housekeeping is kept,
22 brush is kept down. He'll look inside the houses to check
23 mortality, current mortality, what we keep on the records.
24 He'll look at our controller to see what environment is like.

25 Q. "A controller, what do you mean by that?

1 A. "It's a computer controller that controls the environment
2 of the chicken houses, the heat, the air, the cool, basically
3 controls the chicken house and he'll check on it, and it has a
4 constant read-out, and he'll see where we're at, what we've
5 been doing, the history to make sure we're keeping the birds
6 warm.

7 Q. "Keeping the what?

8 A. "The birds warm. He'll walk through the house to see if
9 there's good housekeeping kept there. Just basically be
10 another set of eyes in case I miss something."

11 MS. LONGWELL: Page 55, line 18.

12 Q. "If we refer to this as a Peterson contract, we know what
13 we're talking about?

14 A. "Yes.

15 Q. "Looking at paragraph D, 1D on that first page, read that
16 to the Court, if you would?

17 A. "'To provide reached management practices to grower.'"

18 MS. LONGWELL: Page 57 line 11.

19 Q. "Let me rephrase it. What do you know to be the
20 consequences of not following the recommendations of a field
21 man?

22 A. "You can be terminated. It is possible. I don't know of
23 anybody that has been terminated simply by not following
24 recommendations. Usually you can talk and reach an agreement."

25 MS. LONGWELL: Page 60, line 4.

1 Q. "Let me ask you this then with regard to recommendations.
2 At any time does the field man make recommendations regarding
3 your handling of the poultry waste, moving it or storing it?

4 A. "I think that's part of housekeeping that he looks at. If
5 you've have got a bunch of litter stacked outside or you're
6 tracking a lot of litter outside, he'll recommend it be cleaned
7 up. I've heard of him doing this at other farms."

8 MS. LONGWELL: Page 62, line 12.

9 Q. "Does the field man ever make recommendations or assist
10 you with regard to getting waste analysis or waste tests
11 performed, poultry waste tests?

12 A. "Not field man, no, sir.

13 Q. "Has he ever assisted or made recommendations to you about
14 taking soil samples?

15 A. "No. We're instructed that we must have a waste
16 management plan to even grow chickens, which covers that. It
17 has to be done according to the waste management program.

18 Q. "In fact, that's in your contract, is it not?

19 A. "I believe it is. If it's not, I've assumed it was
20 because I have never read it in the previous contract or this
21 one."

22 MS. LONGWELL: Page 64, line 17.

23 Q. "Who provides the feed for the birds that you grow?

24 A. "The integrator, Peterson or Evans & Evans."

25 MS. LONGWELL: Page 118, line 1.

1 Q. "What efforts or actions does the integrator take in
2 monitoring or assisting you obtaining soil samples?

3 A. "None.

4 MR. MCDANIEL: Object to the form."

5 THE COURT: Overruled.

6 Q. "Does Peterson or its representatives assist or monitor
7 you in taking waste samples, poultry waste samples?

8 A. "No."

9 MS. LONGWELL: Page 178, line 16.

10 Q. "Talking about your residence, sir, what is the water
11 supply that you use for your personal use at the residence?

12 A. "A spring."

13 MS. LONGWELL: Volume two of the deposition of W.A.
14 Saunders, dated October 27, 2006. Page 236, line 21.

15 Q. "Who owns the live chickens that you raise?

16 A. "Mr. Peterson.

17 Q. "The company?

18 A. "Yes."

19 MS. LONGWELL: The deposition Juana Loftin, dated June
20 22nd, 2006. Page 93, line 14.

21 Q. "By the way, what are you are you paid for the litter
22 waste from your operation?

23 "MR. WILLIAMS: Object to the form."

24 THE COURT: Overruled.

25 A. "What do you mean?

1 Q. "The litter which is taken out of your barn, is to be
2 applied, what do you get made for that?

3 A. "Sometimes it's \$11. It varies. Sometimes it's \$11 a
4 truck, sometimes it's \$15, sometimes it's \$20.

5 Q. "What does Mr. Wofford pay you?

6 A. "That much. It varies. Sometimes it's \$11, sometimes
7 \$15, sometimes \$20.

8 Q. "How do you negotiate that with him?

9 A. "Well, if I'm in a big hurry to get those houses cleaned,
10 and like in July when I clean, you know, last year it was
11 getting late, it was late in the year and I couldn't get
12 anybody to take it, so he said he would take it. And I mean he
13 arranged to get somebody to clean my houses and I think he paid
14 me \$15 a load."

15 MS. LONGWELL: Page 97, line 6.

16 Q. "(By Mr. Bullock) How often does -- is it Mr. Wells from
17 the Simmons service tech? How often does though Mr. Wells to
18 the your operation?

19 A. "Well, once a week and sometimes he comes more than once a
20 week. Could be two times or three times or sometimes just once
21 a week.

22 Q. "How much time will he spend there when he comes?

23 A. "Lots of tie.

24 Q. "What types of things does he do while he's there?

25 A. "Different things. He checks everything, my water

1 and in places where there are substantial opportunity for
2 recreational exposure?

3 A. Yes, I was.

4 Q. Were you asked to evaluate whether the data collected by
5 the State in this litigation is reliable and representative of
6 the conditions in the Illinois River Watershed?

7 A. Yes.

8 Q. Dr. Sullivan, with respect to the first of those, did you
9 conduct an analysis of fecal indicator bacteria statewide as
10 compared to the Illinois River Watershed?

11 A. Yes, I did.

12 Q. And have you prepared some exhibits that might help you
13 explain how you went about that analysis and the conclusions
14 that you've drawn from it?

15 A. Yes.

16 Q. Can we go to Demonstrative Exhibit 4, please?

17 THE WITNESS: Your Honor, may I approach the screen
18 here?

19 THE COURT: Let me ask you, Dr. Sullivan, you're not
20 related to ENSR International, are you?

21 THE WITNESS: No, sir.

22 THE COURT: My sister is a hydrogeologist with them.

23 MR. GEORGE: With them, sir. Great firm.

24 THE WITNESS: Well, this is a map of the state of
25 Oklahoma showing the Illinois River Watershed over here on the

1 eastern side, and what we have coded is the stream reaches that
2 are listed as a 303(d) on the 303(d) list for the state of
3 Oklahoma for the year 2004. And the listings are color coded
4 based on whether a stream reach is listed for Enterococcus, or
5 E. Coli, or fecal coliform bacteria. So the yellow lines
6 indicate the listings for Enterococcus. The darker thin lines
7 are for E. Coli and then the whiter pinkish lines are for fecal
8 coliform bacteria. So there are some stream reaches that are
9 listed for two or three of those parameters; other stream
10 reaches that are listed for just one. But what we see is a
11 general pattern of widespread listings throughout the state.
12 There's no indication that the listings in the Illinois River
13 Watershed are really different from what we see statewide.

14 Q. Dr. Sullivan, did you also evaluate the areas in the state
15 of Oklahoma that have more intensive poultry production?

16 A. Yes, I did.

17 Q. Let me refer you to Demonstrative Exhibit 5. Is this a
18 map that you prepared, Dr. Sullivan?

19 A. Yes, it is. Again, it's a map of the state of Oklahoma,
20 and it's color coded by the densities of poultry from the
21 agricultural census information. The darker colors indicate
22 higher densities of poultry. And what this illustrates is that
23 poultry numbers are largest in the eastern part of the state
24 and are much lower in the west.

25 Q. Dr. Sullivan, moving away from just the existence of

1 impaired segments, did you consider on a statewide basis the
2 levels of fecal coliform indicators?

3 A. Yes, I did.

4 Q. Let me refer you to Demonstrative Exhibit 6 and ask you to
5 explain what this is.

6 A. This is data from the EPA database that's called STORET,
7 data largely sampled by the State of Oklahoma, various
8 agencies, and what this shows is bars at the locations, at all
9 the locations in the state of Oklahoma where we had a minimum
10 of five samples with which to calculate a geomean. The dots at
11 the bottom of each bar indicates where that sample was actually
12 collected and then the height of each bar is proportional to
13 the concentration of the fecal indicator bacteria. So in this
14 case this would be for Enterococcus during the recreational
15 period May 1 to September 30. And the other thing that we did
16 is to color code them. The very small green bars that are very
17 short, those are the sites where the geomean concentration did
18 not exceed the standards for Enterococcus, which is 33 CFUs per
19 hundred milliliters. The orange bars are all the sites where
20 the concentration of the geomean concentration did exceed the
21 geomean standard. So what we see is again compared to the
22 Illinois River Watershed, we don't see really anything
23 different throughout the rest of the state in terms of the
24 prevalence of relatively high concentrations above standards
25 and, in fact, there are certain areas, especially in the urban

1 areas around Oklahoma City where the concentrations are
2 significantly higher. So, again, we don't see any apparent
3 geographical correlation between the poultry distribution I
4 just showed or between what we've got in terms of data from
5 this database of the Illinois River Watershed compared to the
6 rest of the state. The important thing here, I think, is that
7 the concentrations that we see in the IRW are not really any
8 different from what we see elsewhere in Oklahoma.

9 Q. Dr. Sullivan, did you limit your analysis to Enterococcus
10 or did you review other fecal indicator bacteria?

11 A. No, I looked at the other two indicator bacteria as well.

12 Q. Let me refer you to Demonstrative Exhibit 7 and ask you if
13 this is another map that you have prepared based upon the same
14 analysis?

15 A. Yes, the same analysis, the same dataset. This will be
16 fecal coliform bacteria rather than Enterococcus. Again, the
17 green bars are those that did not exceed the standard, and we
18 see fortunately much fewer exceedances and, again, there's
19 nothing the least bit unusual about the Illinois River
20 Watershed as compared with geographically across the state in
21 terms of the actual concentrations. So these would be -- would
22 be the geomean concentrations of five or more samples at each
23 site.

24 Q. Dr. Sullivan, did you also review the publicly available
25 data on E. Coli concentrations?

1 A. Yes, I did.

2 Q. Let me refer you to the last exhibit in the series,
3 Demonstrative Exhibit 8.

4 A. The same presentation. Again, we don't see a particular
5 difference in the Illinois River Watershed compared to the rest
6 of the state. I would point out that the five orange bars that
7 you see clustered around the Illinois River Watershed, actually
8 just one of those is inside the watershed. The other four are
9 just outside the watershed boundaries.

10 Q. You can retake your seat, Dr. Sullivan. I appreciate you
11 explaining that. Dr. Sullivan, based on the information that
12 you've reviewed and what you've just discussed with the Court,
13 do the locations of fecal indicator bacteria impairment in the
14 state correlate well with the areas of poultry production?

15 A. I don't see that that's the case, no.

16 Q. Based upon the information you've reviewed, are the areas
17 with the highest levels of fecal indicator bacteria impairments
18 in the state correlated well with areas of poultry production?

19 A. No, they're not.

20 Q. Now, Dr. Sullivan, have you evaluated the potential
21 sources of fecal indicator bacteria in the watershed besides
22 poultry litter?

23 A. Yes.

24 Q. And could you identify for the Court based upon the
25 information that you've reviewed the other significant

1 potential sources that you've identified?

2 A. Well, I think the most significant sources would be people
3 and cattle. We've talked a lot about cattle in this hearing so
4 far, not so much about people. In terms of sources from
5 people, there are many possible routes of fecal indicator
6 bacteria that are derived from human feces to make their way
7 into waterways, and then also derived from human activities
8 other than human feces. Key in that regard would be urban
9 runoff, which has been well-documented in terms of contributing
10 to fecal indicator bacteria in streams. As well as urban
11 runoff, we have septic systems that have been discussed.
12 There's a chronic input of bacteria from wastewater treatment
13 systems, and then there are periodic problems with those,
14 overflows and that sort of thing, sewage breaks. So there are
15 a number of potential sources of fecal indicator bacteria from
16 people that are important. Other sources besides the cattle
17 and the people would be things like wildlife and other
18 livestock.

19 Q. Okay. Dr. Sullivan, in addition to just thinking about
20 people globally, have you looked in this watershed at the areas
21 in which the human population is concentrated in urban areas?

22 A. Yes, I have.

23 Q. Let me refer you to Demonstrative Exhibit 13.

24 THE WITNESS: Your Honor, may I approach? Thank you.

25 Q. (By Mr. George) Dr. Sullivan, can you explain what is

1 Demonstrative Exhibit 13?

2 A. This is a map of land use from USGS data, Natural Land
3 Cover Dataset. I think this is really key to understanding
4 what is happening in this watershed, particularly with respect
5 to the areas of concentration of people. The areas in the
6 light blue color are the urban portions of the watershed. We
7 have a number of smaller urban areas distributed around the
8 watershed, but as we all know, the human populations are mostly
9 concentrated in the eastern part of the watershed. And this is
10 the upstream end of the watershed. And then we have the
11 agricultural areas that are in orange, and the green and other
12 are presumably more natural vegetation is in green. The
13 triangles here are the locations of the wastewater treatment
14 outflows.

15 Q. Dr. Sullivan, you've identified the urban areas as being
16 in what I would refer to as the headwaters of the watershed; do
17 you agree with that?

18 A. Correct.

19 Q. Is that significant scientifically?

20 A. It is significant. It's quite unique. The watersheds
21 that I've studied in the past, none of them have been like
22 this. And the reason it's unique is because in the headwater
23 areas we have what I consider to be some of our most important
24 sources of water pollution including fecal indicator bacteria.
25 Typically what you find, at least in the watersheds that I've

1 studied, is that in the upper portion of the watershed, you
2 tend to have more natural kinds of vegetation, perhaps forested
3 vegetation, that sort of thing, and that as you move down
4 through the watershed, then you have influence of things like
5 urban areas, agricultural activities and some of the things
6 that are associated with potential sources of pollution. So in
7 this situation, we have the opportunity for urban pollution
8 right from the git-go, right at the top of the watershed. That
9 makes it very difficult to evaluate what is happening as we
10 move down through the stream systems and we have other
11 potential sources of pollution added to the streams.

12 Q. Dr. Sullivan, can you explain to the Court the mechanisms
13 through which urban runoff can deliver fecal indicator bacteria
14 to the streams?

15 A. Yes. Urban runoff can deliver bacteria disproportionate
16 to its land area. This is a really important issue, and it has
17 been well-described in the scientific literature. It has to do
18 primarily with the fact that so much of the water that comes
19 down in rain is short-circuited through the urban environment,
20 through the storm drain systems and into the streams, and this
21 is a function of the large percentage of impervious area in
22 urban areas. These are areas where rainfall could not
23 percolate down into the soil. It's rooftops, it's sidewalks,
24 streets, parking lots, construction areas. All these areas
25 where the rain comes down, it can't go down into the soil, has

1 no way to go, nowhere to go, and people like to route it out of
2 the city as quickly as they can through the storm drain systems.
3 That's why they are there. The reason it's important is
4 because as water percolates down through the soil, it's a very
5 efficient filtering mechanism for many pollutants, including
6 fecal indicator bacteria, but with the short-circuiting you
7 have in urban environments there's little opportunity to that
8 to take place. And so you're picking up all the fecal material
9 from dogs, and cats, and wildlife, deer, whatever. Whatever is
10 in that environment short-circuited and moved directly into the
11 stream.

12 Q. Retake your seat, please. Dr. Sullivan, are there, in
13 fact, studies that exist in the scientific literature that
14 discuss the importance of urban runoff on fecal indicator
15 bacteria levels?

16 A. Yes, it's very well-described in the scientific
17 literature. In fact, there was an urban storm -- storm water
18 study by EPA in 1983 where they looked at this issue nationwide
19 and their conclusion was that typical concentrations in urban
20 areas were above 10,000 CFUs per hundred mil. They can be
21 quite high.

22 Q. Is the urban population in this watershed really large
23 enough to make it important as a contributor of fecal indicator
24 bacteria?

25 A. I believe that it is, yeah.

1 Q. Have you actually reviewed population data for the
2 watershed and cities that are located within it?

3 A. Yes.

4 Q. Let me refer you to Demonstrative Exhibit 15.

5 THE WITNESS: Your Honor, may I approach the picture?

6 THE COURT: You may.

7 Q. (By Mr. George) Dr. Sullivan, do you recognize
8 Demonstrative Exhibit 15?

9 A. Yes. First of all, let me state that the total human --
10 estimates of the total human population in the watershed is
11 around 300,000 people. So there are quite a few people in the
12 watershed. What I've attempted to do here is to look at the
13 changes over time and the population and these are the cities
14 on the Arkansas side of the watershed in looking at census data
15 from 1980, 1990 and 2000, and they have quite rapid growth in
16 population. As a matter of fact, northwest Arkansas in the
17 '90's was the sixth largest growing metropolitan area in the
18 United States. So the population growth has been quite
19 extreme. And that makes a big difference in terms of the
20 amount of construction that's going on, and that's certainly
21 something that I've observed in the watershed is that in that
22 easternmost upper end of the watershed there's a great deal of
23 construction, and that provides a lot of this impervious area
24 that I was talking about before.

25 Q. Dr. Sullivan, if you could retake your seat. Thank you.

1 Dr. Sullivan. You mentioned the triangles on this map. Could
2 you remind us what they refer to?

3 A. Yes. These are the wastewater treatment plants that
4 discharge directly into the stream system.

5 Q. Dr. Sullivan, in addition to the daily discharges, has
6 your work in this case documented any periodic discharges of
7 untreated wastewater?

8 A. Yes.

9 Q. And let me refer you to Demonstrative Exhibit 16, which is
10 a copy of a chart that's included in your expert report.

11 THE WITNESS: Your Honor, may I approach?

12 THE COURT: You may, sir.

13 Q. (By Mr. George) Dr. Sullivan, could you please explain
14 Demonstrative Exhibit 16?

15 A. Yes. This is a summary of data that were available on
16 sewage bypasses from some of the communities inside the
17 Illinois River Watershed, and the point is that there were
18 periodic discharges or bypasses with rather large volumes of
19 raw sewage. This would not be sewage that had been treated.
20 This is not like a bypass when it rains too much. This is a
21 bypass -- it can be a bypass when it rains too much and there's
22 raw sewage that's actually released directly into the river
23 system or some other kind of a sewage line break that has the
24 potential to impact the stream system. But we have median
25 concentrations from the different communities that can be as

1 low as 200 gallons to as high as 7,000 gallons depending on
2 which community we look at, and with median concentrations of
3 fecal coliform bacteria that range between about ten to the
4 twelfth and ten to the fourteenth. So ten to the ninth is a
5 billion, ten to the twelfth is a trillion, so these are
6 trillions of bacteria per bypass. This is an infrequent source
7 but can be a significant source of fecal indicator bacteria to
8 the stream system.

9 Q. Dr. Sullivan, you mentioned a -- perhaps a break in a
10 sewer line as an explanation. What were some of the other
11 causes well known to result in a bypass of a treatment process
12 and direct discharge?

13 A. It would be the treatment system receiving more water
14 because of high rainfall, more water than it can handle, and
15 therefore, they can be forced to discharge some of the
16 wastewater. And this is an occasion that happens during storm
17 conditions.

18 Q. Dr. Sullivan, let me refer you back to Demonstrative
19 Exhibit 13, which is your watershed map. Are there any
20 municipal sewage systems that operate in the basin that are not
21 shown in your map?

22 A. Yes, there are. There are municipal sewer systems that
23 don't discharge directly through a pipe into the stream system.
24 They would have like a lagoon system, for example, to deal with
25 the sewage material. There's one that I'm aware of that's in

1 the vicinity of Watts.

2 Q. The one you're aware of in the vicinity of Watts, is it
3 located near the Illinois River?

4 A. Yes, it is.

5 Q. Approximately how close are the lagoons at Watts?

6 A. They're about 500 yards away from one of the USGS sampling
7 site locations, what's called the Watts site.

8 Q. The USGS sampling location at Watts, have you reviewed the
9 data from that location?

10 A. Yes. They have periodically collected water samples and
11 analyzed them for fecal indicator bacteria, and I've looked at
12 those data.

13 Q. Have you noted in the data from the USGS station at Watts
14 anything interesting or peculiar in terms of bacteria
15 concentrations?

16 A. Yes. USGS has collected samples from a number of sites
17 around the watershed, and the location at Watts is somewhat
18 different for two reasons. First of all, it tends to be
19 higher, often quite a bit higher than any of the other
20 locations; and secondly, it tends to jump up quite a bit as
21 compared with the site immediately upstream of Watts, and
22 that's at the Arkansas Highway 59 bridge crossing, and that
23 site is only about four miles away. So in a rather small space
24 of river reach, we tend to see oftentimes quite significant
25 increases in bacteria and, again, achieving what are normally

1 the higher levels of bacteria in the system as measured by
2 USGS.

3 Q. Let me refer you to Demonstrative Exhibit 78. Can you
4 describe for the Court what's shown in Demonstrative Exhibit
5 78?

6 A. Yes.

7 THE WITNESS: Your Honor, may I approach the screen?

8 MS. BURCH: Your Honor, I object to the use of this
9 photo as well. This wasn't in the considered materials.

10 MR. GEORGE: Your Honor, it's a demonstrative exhibit
11 simply designed to illustrate -- actually not illustrate,
12 depict the conditions the witness has just described.

13 THE COURT: And as a demonstrative we're not admitting
14 it into evidence?

15 MR. GEORGE: That's correct, Your Honor.

16 THE COURT: Overruled.

17 THE WITNESS: May I approach the screen?

18 THE COURT: You may.

19 A. This is the location of the lagoons for the City of Watts
20 and the application area for the excess water. This is the
21 main stem Illinois River, and this is the bridge crossing,
22 Oklahoma Highway 59 where USGS collects their samples. So the
23 distance from the lagoons to the sampling site location is
24 about 500 yards.

25 Q. (By Mr. George) Dr. Sullivan, are you aware of any

1 concerns being voiced by federal agencies about bacterial
2 contamination of the river from these lagoons?

3 A. Yes. U.S. Fish and Wildlife Service voiced concerns in
4 conjunction with a request to increase the capacity by taking
5 sewage from West Siloam Springs and adding it to the Watts
6 system, and the concern voiced by USGS was with respect to the
7 possibility of polluting the Illinois River.

8 Q. Okay. Retake your seat, please. Now, Dr. Sullivan, for
9 all of the sources that you've identified and discussed with
10 the Court for fecal indicator bacteria, do you have an opinion
11 as to when these sources are most likely to influence bacterial
12 levels in the streams and rivers?

13 A. Yes. That would be at high flow.

14 Q. Have you actually looked at water quality conditions that
15 exist during periods of low or moderate flow as well?

16 A. Yes, I have.

17 Q. Okay. And why have you done that?

18 A. Well, I think it's important to distinguish between high
19 and low flow because as I understand it, a major point of this
20 preliminary injunction is the possibility of exposure of
21 recreationists, especially with primary body contact
22 recreation, which is actually swimming and being in the water
23 with the possibility of ingestion, and in my opinion, that
24 would be most likely to occur during low and moderate flows.
25 So I think it's important to separate out the concentrations

1 that are achieved at high flow versus what's achieved at the
2 lower flow conditions.

3 Q. Dr. Sullivan, have you, based upon your review of the data
4 collected during high flow, low flow and moderate flow
5 conditions, reached any conclusion as to the general condition
6 of the water during the time that you've described as most
7 likely to be used for primary body contact recreation?

8 A. The general contact -- the general condition of the water
9 during the lower and moderate flows is generally not above the
10 standards for fecal coliform bacteria or E. Coli.

11 Q. Dr. Sullivan, have you also looked at not only the times
12 of use but the areas in which water in the watershed is most
13 commonly used and evaluated data based on those areas compared
14 to areas where it is not used as regularly?

15 A. Yes, I have.

16 Q. Okay. Let me refer you to Demonstrative Exhibit 19, which
17 is a map.

18 THE WITNESS: Your Honor, may I approach the exhibit?

19 THE COURT: You may, sir.

20 Q. (By Mr. George) Dr. Sullivan, could you explain what is
21 shown on Demonstrative Exhibit 19?

22 A. Yes. This is a depiction of the stream system in the
23 Illinois River. The area that was identified by Dr. Caneday as
24 the main recreation area is coded here in orange, so you can
25 see where that is. And these are color coded by what's called

1 Strahler Stream Order, and this -- I may need to have just a
2 little bit of time to explain what this means so that this
3 demonstrative can make sense. Strahler Stream Order is a way
4 of classifying stream reaches based on their size or relative
5 size and their position in the watershed. So if you start up
6 in the headwaters with a small stream, that will be called a
7 first order stream, a stream with no tributaries feeding into
8 it. That's a first order stream. As it flows downhill and
9 combines with another first order stream, then that becomes a
10 second order stream. As that continues down the hill, if more
11 first order streams flow into it, it's still second order, it
12 doesn't change, but once two second order streams come
13 together, that becomes a third order stream and so on. And so
14 what I've done is I've not shown the first order streams on
15 here. I've shown the second order through seventh order.
16 Where Barren Fork joins with the main stem Illinois River down
17 here right at the bottom of the watershed it becomes seventh
18 order there. So Basically we're looking at a distribution
19 going from second order down through sixth order, and this is a
20 way of classifying the stream so we can look at conditions like
21 chemistry or bacteria concentrations in the smaller streams
22 versus the larger streams, which is important in this case
23 because it's the larger streams where my understanding that
24 most of the recreation occurs that would be likely to have
25 primary body contact.

1 Q. Dr. Sullivan, what are the stream orders that, based on
2 the information you've been provided are the ones that receive
3 the most substantial use in terms of recreation; what order?

4 A. The sixth order. The main stem Illinois River through
5 here, the sixth order.

6 Q. There's been some testimony in this court about use of the
7 Flint Creek area for recreation, including water recreation.
8 What stream order is that area?

9 A. That would be fourth in its upper reaches and fifth in its
10 lower reaches. So these areas that are identified as key
11 recreation areas would be fourth, fifth and sixth order.

12 Q. Dr. Sullivan, when you reviewed the data collected by the
13 State from its sampling in this case, with regard to the
14 fourth, fifth and sixth stream orders, do you have an opinion
15 as to whether the water quality conditions generally are
16 satisfactory in terms of water quality standards in those
17 areas.

18 A. Yes, with respect to fecal coliforms and E. Coli, they're
19 generally satisfactory.

20 Q. Where are the areas in which the State's sampling has
21 identified the higher levels of fecal coliform or fecal
22 indicator bacteria?

23 A. That would be primarily in the smaller streams.

24 Q. Now, Dr. Sullivan, as part of your review in this case,
25 did you consult and analyze information regarding the protocols